BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 17 1938

SCIATICA AND ITS TREATMENT*

BY

WILFRED HARRIS, M.D., F.R.C.P.

Consulting Physician, St. Mary's Hospital; Physician, Maida Vale Hospital for Nervous Diseases

Sciatica, or pain which is referred along the course of the sciatic nerve, may arise from a great number of causes. One of the commonest is a perineuritis of the sciatic sheath in the region of the sciatic notch where the nerve escapes from the pelvis into the buttock, which may be due to the spread of rheumatic or gouty fibrositis of the lumbo-sacral fascia or lumbar muscles, known as lumbago.

The nerve trunk may be the subject of a neuritis from toxic causes, such as diabetes, lead, arsenic, etc., or an infective neuritis from dental sepsis. I have known it produced by a direct chill to the buttock from sitting on a cold wet seat; and trauma to the buttock from a fall in the hunting field or prolonged pressure from lying on a hard surface, as in coma due to mine explosions, will produce it.

Types of Sciatica

One may speak of two types of sciatica, high sciatica and low sciatica, the latter form being due to lesions in the neighbourhood of the sciatic notch, as already referred to. In this type the Achilles jerk is often lost, and there may be a tendency to lean over towards the affected side. High sciatica would be due to lesions in the neighbourhood of the intervertebral foramina around the fourth and fifth lumbar nerves, due to rheumatic or septic inflammation, or even to osteo-arthritis. In this form the Achilles jerk is usually unaffected, as this reflex is concerned in the first sacral root, and there is often well-marked contralateral scoliosis in which the hip on the affected side is thrown outwards and the patient leans away from that side. In these cases forcing the body into an erect position causes pain down the affected leg. In this type of case, unless contractures have developed after many months of suffering, the scoliosis disappears on lying flat, especially if the legs are pulled down, with the body held to resist the pull. This disappearance of the scoliosis without producing pain is probably due to the nerve roots no longer being pressed on at the intervertebral foramina, and is a demonstration that the contralateral scoliosis apparent on standing is an involuntary posture assumed by the patient to relieve the pressure at these points and is not caused by arthritis of the intervertebral articulations, as asserted by Putti.

* Read in opening a discussion at a joint meeting of the Sections of Neurology and Psychological Medicine, and Orthopaedics and Fractures at the Annual Meeting of the British Medical Association, Plymouth, 1938.

Aetiology

Pain in the sciatic distribution may be caused by many forms of bony abnormality, such as sacralization of the fifth lumbar vertebra, or a separate first sacral piece which may be called a sixth lumbar vertebra. Sacro-iliac subluxation from trauma or due to the flat back acquired on an operating table under a prolonged anaesthetic is another cause of pain in the region of the lower part of the buttock which may be associated with pain down the back of the thigh. This pain, which is sometimes agonizing, may be due to the lumbo-sacral cord being pressed on by the sharp edge of the sacrum at the sacro-iliac joint. These cases are sometimes dramatically cured by manipulation under an anaesthetic.

Bony disease in the pelvic bones, such as Paget's disease affecting the ischium, or other tumours of the pelvic bones or in the pelvis, secondary malignant growths in the lumbo-sacral spine, or tumours in the lumbo-sacral cord or cauda equina, have all to be considered in the diagnosis of obscure cases of pain in this region. What may be called malignant sciatica is by no means an uncommon sequel of carcinoma of the breast.

In the diagnosis of these cases care must be taken to examine for muscular wasting in the leg or thigh, for patches of anaesthesia, or for alterations of the deep reflexes. If the knee-jerk is diminished or lost we know at once that the case is not a true sciatica, but that the anterior crural system is involved. Lumbar puncture and examination of the cerebrospinal fluid may give a clue in tumours low down in the spinal canal involving the sacral cord or cauda equina. Besides the more usual forms of tumour such as fibroma or sarcoma, cysticercus, lipoma, and chronic arachnoiditis, with cystic formation, may be mentioned, and herniation of the body of an intervertebral disk. These will scarcely show in radiographs, except with careful lipiodol pictures. The pressure may be found to be below normal, and there may be other evidences of spinal block, with high protein content in the fluid.

Tuberculous caries of the ilium or sacrum, with or without psoas abscess, or intrapelvic pressure from a high forceps delivery in childbirth may press upon the nerve and cause severe dropped foot, with anaesthesia of the sciatic distribution. I saw one such case, with left sciatic paralysis, in which delivery was accomplished under an anaesthetic. There was also paralysis of the musculo-

spiral nerve on the right side from arm pressure against the edge of the table. The diagnosis which had been sent up with the case to hospital was "crossed paralysis."

Osteo-arthritis of the hip-joint may cause pain not only in the region of the hip and knee but even down to the ankle, and true sciatic neuritis may result from spread of the inflammatory reaction around the hip-joint to the sciatic nerve, which passes only half an inch behind it. In all cases it is advisable to examine the movements of the hip-joint to make sure that they are free. In many cases of sciatica, whether of the low or the high type, the pain will be increased by stretching the nerve, as by flexing the hip with the knee straight. This sign is usually known as Lasègue's sign, which is precisely the same as Kernig's sign in meningitis. Patients suffering from sciatica usually prefer to lie on the opposite side, with the affected knee slightly drawn up, and a pillow should be given to separate the knees, with a curved support under the bedclothes to prevent the weight pressing on the foot.

Points in Diagnosis

There are many points, therefore, to attend to in the diagnosis of a case of apparent sciatica when first presented: knee-jerks and Achilles jerks should be compared with those on the other side, muscular wasting should be looked for, and the sensation also tested. The hip-joint should be moved and the nerve stretched gently to look for increase of pain, and a rectal examination is generally advisable. If the knee-jerk is diminished, tabes dorsalis may be thought of and the pupils examined, or alcoholic or diabetic neuritis looked for.

Tenderness over the notch in the buttock and along the upper part of the nerve is common in the low type of sciatica, but usually this is not present in high sciatica with contralateral scoliosis. There is no wasting of muscles in the common rheumatic types of sciatica, either of low or high type, except in the very chronic cases of many months' or years' duration, when the nerve may be actually shrunken and cord-like. In such extreme cases it will be necessary to cut down upon the nerve and scarify it longitudinally in order to free the adhesions.

Treatment

The treatment of sciatica will vary according to the type. In the low type of sciatica, especially when there is tenderness at the notch and the patient leans towards the affected side, rest in bed should be insisted on, and local heat by radiant-heat lamp or infra-red rays may give considerable relief. Some practitioners favour short-wave radiothermy, and I have seen this successful when most other treatments have failed, but as a rule I have not found diathermy to be of much service. Galvanism often aggravates the pain in the acute stage of sciatica, though in the chronic stage it sometimes may prove valuable. Moist hot packs, such as cataplasma kaolini or mud packs, or mud baths at Harrogate or at the Continental spas such as Pistany or Acqui, may be given in chronic cases where the patient is able to walk. The very acute cases must be treated in bed. Local applications of liniments, such as A.B.C. or methyl salicylate, may be applied in addition to hot packs, and for the acute pain analgesics should be used freely. Compound aspirin tablets with or without codeine, and in more severe cases pyramidon, heroin, and medinal cachets, or actual injections of omnopon or morphine, may be necessary to tide the patient over the severe attacks of pain and to produce sleep.

Two methods of massive injection of novocain and saline may be used with great benefit in a large proportion of cases, and sometimes rapid cure may follow their use. In the low type of sciatica such as that following lumbo-sacral fibrositis, in which there is tenderness on pressure over the nerve in the buttock and at the notch, the injection may be made into the nerve trunk itself at the notch and a second injection at the level of the small trochanter. This is not the place to give the details of the method of injection, but 2 c.cm. of 2 per cent. novocain are first injected into the nerve and then 80 to 100 c.cm. of normal warm saline. A second injection may be of service a few days later. This method of injection of the nerve was first used in 1902 by Lange (1904).

Another method of epidural injection was advocated in 1901 by Sicard (Sicard, 1921)—by injection of novocain and saline up to 100 c.cm. into the sacral canal through the sacro-coccygeal foramen. Owing to the sacral canal not communicating with the intrathecal space, which ends at the level of the lower end of the first piece of the sacrum, the saline forces its way upwards outside the theca, stretching the sacral and even the lumbar roots as they emerge. This method is probably of greater service in the high form of sciatica. Other solutions are sometimes used, such as 10 to 20 c.cm. of a 40 per cent. solution of antipyrine, as Feiling (1928) recommends.

For obstinate chronic cases Dogliotti's method of intraspinal injection of absolute alcohol has been recommended; but it is a dangerous treatment, and should not be undertaken by a novice. I have used it with success in a case of eight years' severe constant pain and misery due to sacralization of the fifth lumbar vertebra, procuring several months' complete relief of pain, though for the first fortnight sphincter paresis was present.

Fixation of the limb with a Liston splint along the side has been advised, but I do not recommend it, as patients usually cannot bear to be kept in a fixed position for many hours. Another form of fixation is sometimes of benefit—namely, a plaster jacket, applied with the patient slung up by the armpits and head so as to stretch the spine, the plaster bandages being applied from under the armpits to just below the level of the great trochanters. The advantage of a plaster jacket is that the patient can get about and even attend to his business, in reason, though it has certain obvious disadvantages. An alternative is keeping the patient confined to bed, with the feet raised on six-inch blocks, and extension to the spine applied by means of leather anklets attached by cords running over pulleys fixed on the foot of the bed to separate shot-bags weighing 6 to 8 lb. A certain amount of counter-extension by padded axilla rings tied to the head of the bed will probably be necessary in addition to the raising of the foot of the bed on blocks. This method of extension does not preclude a certain amount of lateral movement or rotation by the patient, and the weights are easily detached at night or for toilet purposes.

If a plaster jacket is applied it is very important that proper extension to the spine, including the neck, should be arranged for during the whole period of the fixing of the plaster and its setting. This is best done by the use of Sayre's extension apparatus, with tripod and pulleys fixed to leather bands for the chin and occiput, and axilla pads. The patient is slowly and carefully raised by the pulleys on to his toes, most of the weight being taken by the arms. If raised in this way the patient can remain quite comfortably semi-suspended while plaster bandages are applied from axillae to trochanters over a

stockinet vest, the bony prominences, such as the iliac crest, being well padded with adhesive felt, known as elephant plaster.

Conclusion

Briefly, therefore, the treatment of an acute severe sciatica should be complete rest in bed, with local anodyne liniments and cataplasma kaolini, and sometimes local heat by infra-red rays. Analgesic drugs must be given, such as aspirin, phenacetin, and caffeine tablets, with or without codeine or opium, and even morphine or heroin injections may be required for a few days. Sleep may be obtained by the use of 7½ grains of medinal with two veganin tablets. Massage must never be used in the acute stage. Later in the more chronic stage massage may help, and galvanism, diathermy, or local heat should be tried. If these fail, massive injection of the nerve or epidural injection by novocain and saline, and extension by weights attached to anklets, with counter-extension at the axilla, should be tried. If these give only temporary relief, it may be advisable to fix a plaster from the axillae to the trochanters so that the patient may be able to get about and attend to a certain amount of business.

REFERENCES

Feiling, A. (1928). *British Medical Journal*, **1**, 386.
Lange, J. (1904). *Münch. med. Wschr.*, **51**, 2325.
Sicard, J. A. (1921). *Traité Path. Méd.*, Paris, **2**, 106.

INTERVERTEBRAL DISK LESIONS AS CAUSE OF SCIATICA*

BY

JOSEPH S. BARR, M.D.

Boston, Mass.

(WITH SPECIAL PLATE)

A symposium such as this, which brings before us the experience of various men gained from the laboratory, the operating theatre, and the office or dispensary, is a valuable method of integrating our expanding knowledge concerning sciatica. It gives me particular pleasure to open the discussion, and I am deeply sensible of the honour conferred upon me.

For our purposes we may define sciatica as a symptom characterized by the complaint of pain in the posterior thigh and postero-lateral calf. You will note that I do not call it neuralgia, neuritis, or radiculitis, nor do I state that it is pain in the course of the sciatic nerve. It is presumably peripheral pain in the regions supplied by the sciatic nerve, due to irritation of the nerve or of any of the roots of the lumbo-sacral plexus which form the nerve. It must be obvious to all but charlatans and quacks that there are many causes of sciatic pain, the mere enumeration of which is tedious. The actual pathological change present in many, perhaps most, of the clinical cases of sciatica is unknown. It is quite probable that further advancement in our knowledge of this condition will come chiefly from increased experience of the actual pathology present and not from theoretic considerations or didactic therapeutic tests. A search of the literature reveals a plethora of cures and a sad dearth of knowledge as to what is being cured. There is one group of patients whose sciatica we have come to recognize as being due to the pressure of intervertebral disk tissue displaced posteriorly against one or more roots of the cauda equina. It is of this pathological entity that I wish to speak.

Anatomy

A normal intervertebral disk is composed of a semi-fluid gelatinous central nucleus pulposus which is encircled by a ring of dense coarse fibrous tissue, the annulus fibrosus. The annulus is intimately attached to the cartilaginous end-plates of the vertebrae immediately above and below each disk and also blends with the strong anterior and posterior longitudinal vertebral ligaments. Each intervertebral disk has a certain internal pressure which prevents its collapse when the superincumbent weight is placed upon it. The total amount of spinal mobility is the summation of the mobility of each of the intervertebral disks.

The function of the disk is to permit mobility of the spine, to cushion the central nervous system from trauma, and to transmit the body weight from one vertebra to another. Schmorl has made exhaustive studies of the pathological changes which occur in intervertebral disks. Extrusion of the nucleus pulposus may occur in any direction, following weakening of its surrounding tissues by developmental defect, disease, or trauma. If the cartilaginous end-plate is weakened, protrusion may occur into the vertebral body. Such lesions can often be detected by radiographs. (See Fig. 5, Special Plate.) So far as is known, these protrusions never cause radiating pain. If the annulus fibrosus is weakened by disease or trauma, peripheral protrusion of intervertebral disk tissue will occur, sometimes slowly, as a developing hernia, sometimes very rapidly, as a traumatic rupture. Schmorl found that small posterior protrusions into the spinal canal occurred in about 15 per cent. of spines examined at necropsy. He felt that they were of no particular clinical significance. Kocher in 1898 and Middleton and Teacher in 1911 reported cases of traumatic posterior intervertebral disk ruptures of sufficient size to cause paraplegia.

Neurological surgeons have recognized and removed tissue arising from intervertebral disks and pressing on the spinal cord or nerve roots, and have called these tumours chondromas or ecchondromas. It is quite probable that most of these tumours were not true new growths, but were actually displaced intervertebral disk tissue. With the advent of localizing diagnostic procedures, particularly the use in the subarachnoid spaces of iodized oil opaque to the roentgen ray, we have begun to appreciate that these posterior protrusions are not uncommon lesions and that many patients whose sciatica was previously unexplained, or who had been treated for sciatic scoliosis or lumbo-sacral or sacro-iliac strain, were in fact suffering from pressure on one or more roots of the cauda equina caused by displaced intervertebral disk tissue. We have had over eighty cases verified by operation at the Massachusetts General Hospital. Posterior ruptures of intervertebral disk tissue may occur at any level, but seem to occur most frequently in the cervical and lumbar regions. The disk between the fourth and fifth lumbar vertebrae is by far the most common site. This is probably due to the fact that this represents the apex of the anterior lumbar curve and the point of maximum stress from the superincumbent body weight. About 50 per cent. of the lumbar lesions occur at this disk; 35 per cent. at the lumbo-sacral disk. It is obvious, I think, that the symptoms and signs of a ruptured lumbar

* Read in opening a discussion at a joint meeting of the Sections of Neurology and Psychological Medicine, and Orthopaedics and Fractures at the Annual Meeting of the British Medical Association, Plymouth, 1938. Material from previously published articles by Dr. J. W. Mixter, Dr. A. O. Hampton, and the author has been freely adapted for this paper.

intervertebral disk will vary greatly, depending on its location and size. The largest protrusions cause complete occlusion of the dural sac with the usual signs and symptoms of paraplegia, partial or complete, with sensory motor and reflex changes, and partial or complete sphincter paralysis. There should be no difficulty in diagnosis or localization of such lesions. The smaller disk protrusions that press on only one or two roots are the ones which present difficulties in diagnosis and which may cause sciatic pain without demonstrable neurological changes.

TABLE

	Per cent.
Location of lesion:	
Disk between L4–5	50
" " L5–S1	35
" " L3–4 } " " L1–2 }	10
" " L2–3	5
History of injury:	
(*a*) Immediately preceding disability	50
(*b*) Latent period preceding disability	30
Total	80
Type of injury:	
Lifting a heavy weight	50
Falls from a height } Twisting strain } Miscellaneous	30
No known injury	20
Pain:	
Constant from onset until operated upon	60
Remissions and relapses	40
Areas to which pain was referred (unilateral 80 per cent.: bilateral 20 per cent.):	
Posterior and lateral thigh	95–100
Postero-lateral calf	90
Lumbo-sacral region	70
Gluteal and sacro-iliac regions	65
Lateral border of foot	5
Signs:	
Positive Lasègue (limitation of straight leg raising)	100
"Sciatic scoliosis"	60
Reversal of lumbar curve (kyphos or flat back)	90
Local tenderness over the lumbar spinous processes	50
Radiating pain on coughing, sneezing, or jugular compression	40
Neurological signs:	
Absent or diminished ankle-jerk	50
Sensory change in the extremity (anaesthesia or hypoaesthesia)	35
Motor changes (weakness or paralysis)	15
Sphincter disturbance	5
Lumbar puncture:	
Total protein content above 40 mg. per 100 c.cm.	85
Total protein content below 40 mg. per 100 c.cm.	15
Dynamic evidence of block, whether partial or complete	10
Cytological changes in spinal fluid	rare

This table is a statistical summary of data obtained from a study of the records of over 100 verified cases of lumbar intervertebral disk ruptures into the spinal canal.

The symptoms and signs of a ruptured lumbar intervertebral disk are so constant and characteristic that the presumptive diagnosis can often be made before radiological studies are made by the use of lipiodol. The typical case is a vigorous man in his thirties who was perfectly well until, while lifting a heavy weight, he felt something "snap" in his low back and had immediate pain in the lumbo-sacral region. Some time thereafter he developed "sciatica" in one leg, which he describes as a deep-seated pain beginning in the buttock, radiating down the posterior thigh, the postero-lateral aspect of the calf, and occasionally going into the lateral border of the foot. Coughing and sneezing, bending forward to tie the shoes, and lying face down in bed cause marked increase in the radiating pain. If an uncomfortable position is maintained for a time the leg tingles and the foot may "go to sleep." There have been two or three separate periods of disability, the first ones relieved by rest in bed; the last one, however, has yielded to no conservative measures, including back-strapping, heat, bed rest, plaster casts, corset, and osteopathic manipulation. On examination the patient is found to stand with his trunk thrust forward and to one side, with most of his weight borne on the non-painful leg—"sciatic scoliosis." The normal lumbar lordosis has been lost, and in its place is a fixed reversal of the lumbar curve, with prominence of the spinous process of the third, fourth, and fifth lumbar vertebrae. All motions of the lumbar spine are considerably restricted by fixed involuntary muscle spasm. The patient's finger-tips cannot possibly be made to touch the floor if the knees are kept straight. The fixed list of the spine and pelvic tilt are uninfluenced by a lift under either foot. In the sitting position the trunk can be flexed at the hips with ease, so that the chest approaches the knees, but observation reveals that the lumbar spine remains in its fixed position and goes forward *en bloc*. The list of the lumbar spine may not be as noticeable, but side bending remains restricted. (Fig 1., Special Plate.)

The patient gets into bed or on to the examining-table with extreme care. Turning over on the table is an ordeal, and he is unable to lie face down until a fat pillow is placed beneath the abdomen. In that position on palpation there is found slight but definite local tenderness in the mid-line between the fourth and fifth lumbar spinous processes or at the lumbo-sacral junction. There may be a little tenderness at the sacro-sciatic notch on the affected side. Inspection reveals some atrophy of the buttock, thigh, and calf of the painful side. The ankle-jerk is usually absent on the painful side, normal on the other. The other reflexes are all normal. No definite sensory or motor changes are made out. Straight leg raising can be carried through an arc of 70 degrees on the non-painful side and 20 to 30 degrees on the painful side. An attempt to force the leg upward beyond this point causes sharp increase in the sciatic pain. A history and physical examination similar to this suggest strongly that the diagnosis is posterior rupture of one of the lower lumbar intervertebral disks. The usual antero-posterior and lateral radiographs are of little diagnostic aid. They may be entirely normal, as the displaced disk tissue casts no *x*-ray shadow and the intervertebral spaces may be normal in width, the volume of the displaced tissue being too small to cause apparent narrowing. A definitely narrowed space between the fourth and fifth lumbar vertebrae is of some diagnostic importance when present. A narrow lumbo-sacral interspace occurs about as frequently as other congenital abnormalities, such as sacralized transverse processes and spina bifida, and should be considered as an incidental finding. The scoliosis and kyphosis noted clinically are also seen on the radiograph.

The next step in diagnosis is the lumbar puncture, which should be done as low as possible, preferably at the lumbo-sacral interspace. The first 2 c.cm. of fluid removed should be sent as a separate specimen for determination of the total protein. After careful manometric tests to rule out dynamic block further fluid is withdrawn for cytological study and for Wassermann and colloidal gold tests. A total protein higher than 35 or 40 mg. per 100 c.cm. is confirmatory evidence that the pathological process is intraspinal. We have a few proven cases in our series which have had a normal total protein, but the average figure has been above 60 mg. per 100 c.cm.

As the lesion is usually at one of the two lowest intervertebral disks, the lumbar puncture needle is seldom

placed caudal to it, and it is rare to find any dynamic block. The "reverse Queckenstedt" test described by Love may be of some diagnostic significance.

Examination with Iodized Oil

The radiological examination after the injection of iodized oil is the most important step in the diagnosis. The lesion can be accurately localized and readily demonstrated on the radiograph. It is necessary that the examination be done with the proper technique. In a series of over 150 cases we observed no permanent ill effects which could be attributed to the use of iodized oil in the spinal subarachnoid spaces. It is important to use oil that shows no deterioration—that is, no liberation of free iodine. It should be of a very light colour. (Fig. 3, Special Plate.)

One ampoule (5 c.cm.) of iodized poppy-seed oil is injected into the subarachnoid lumbar canal. A satisfactory examination cannot be made with smaller quantities. A delay of a few hours to two or three days between the injection and the radiological examination allows time for the oil to fill the root sheaths and permits better visualization of any defect in filling. It may be necessary to give the patient appropriate drugs for the relief of pain so that he can co-operate in the examination. The equipment for the examination consists of a tilting table for screening and a quick change-over switch so that instantaneous films can be taken. The usual equipment may, however, be used with fairly good results in the examination of the lumbar area. The advantages of films taken in this way cannot be overestimated. Before the examination is begun the patient is allowed to sit up for a few moments in order to collect the iodized oil as one mass in the sacral cul-de-sac. He is then placed facing the table in the upright position, and by manipulation of the table under radiological control the oil is forced to flow slowly up and down the anterior aspect of the subarachnoid spaces when the patient is tilted to the horizontal or the Trendelenburg position. Particular attention is directed towards maintaining the iodized oil in a single mass, and it is possible by this method to place the small quantity of iodized oil in practically any portion of the lumbar canal. Since the lesion to be demonstrated is a small anteriorly placed extradural nodule at the disk levels, the iodized oil must be brought into contact with the anterior dural surfaces, and in order to do this the patient must lie face down on the table. If a questionable filling defect is observed, repeated efforts are made to obliterate it either by turning the patient from side to side or by repeating the tilting process. A constant filling defect in any region is recorded by serial radiographs taken at various angles of rotation of the patient. The upper dorsal area is not examined when the patient has no symptoms referable to that portion of the spinal canal. It is possible that this fact may account for the infrequency of some of the untoward reactions attributed by others to the use of iodized oil. The examination of the upper dorsal area is, however, carried out, when indicated, in the same manner as the examination of the upper lumbar and lower dorsal areas. Care should be taken to prevent the iodized oil from entering the skull, and this can be done by examining the cervical area with the patient in the face-down and lateral positions only.

LEGENDS FOR ILLUSTRATIONS IN SPECIAL PLATE

FIG. 1.—Photographs of a patient with lateral list (sciatic scoliosis) and abnormally flat lumbar spine seen in majority of cases of sciatica due to intervertebral disk rupture.

FIG. 2.—Actual appearance of a ruptured disk at operation. The laminae of two vertebrae have been removed, the dura has been opened, and the roots of the cauda equina retracted, exposing the nodule of disk tissue over which a nerve root is riding.

FIG. 3.—Drawing of *x*-ray appearance of a normal spine after complete filling of the subarachnoid space with iodized oil. The extradural course of the nerve roots is indicated by the dotted lines. The point of exit of each root can be identified by the axillary pouches marked A. Note that a ruptured disk at L4–5 will press on the fifth lumbar root but cannot involve the fourth root.

FIG. 4.—A ruptured disk may cause a complete block as illustrated by this case. The patient's original complaint was unilateral sciatica. There were only minor motor and sensory changes. She was completely relieved by removal of a large posteriorly displaced disk fragment.

FIG. 5.—A well-defined characteristic filling defect in the lipiodol column at the level of the L4–5 intervertebral disk. Note the obliteration of the axillary pouch. A ruptured disk fragment 1 cm. in diameter pressing upon the left fifth lumbar root was found at operation.

FIG. 6.—Antero-posterior film showing an hour-glass constriction of the lipiodol column which was found at operation to be due to a markedly thickened or hypertrophied ligamentum flavum. The patient's symptoms and clinical examination were very similar to the ruptured disk group.

FIG. 7.—Antero-posterior and lateral films showing irregular filling and partial block which was found at operation to be due to chronic adhesive arachnoiditis. The defect is not directly opposite the intervertebral disk, and appears to be intradural.

Interpretation of Radiographs

A correct understanding of the results of radiological examination is dependent on an accurate knowledge of the anatomy of the cauda equina and the nature of the lesion to be demonstrated. The anatomical considerations are beyond the scope of this paper, and only typical examples of the filling defects produced by the shadow of the contrast medium can be discussed. The posterior rupture of the intervertebral disk which produces unilateral symptoms consists of a rounded nodule 1 cm. or more in diameter. This nodule lies just lateral to the strong central portion of the posterior longitudinal ligament and is directed towards the lamina of the vertebra, usually just opposite the articular facet. It produces an indentation or filling defect in the column of iodized oil, best seen in the antero-posterior view. Unless the defect is very large its presence is obscured in the lateral view by the dense iodized oil lying in the normal side of the canal. The defect is often crescentic or dog-nose in appearance. (Fig. 5, Special Plate.) Minor pressure defects only seen in the lateral view probably represent the normal physiological bulge of the intervertebral disk and have no clinical significance.

Large ruptures may produce a complete or nearly complete block to the flow of the iodized oil, and the appearance may simulate that of an intradural tumour. (Fig. 4, Special Plate.)

Ruptures at the level of the lumbo-sacral disk are more difficult to demonstrate than those higher up, as the dural sac is narrower and smaller here than elsewhere, and so only a small filling defect may be produced by a relatively large protrusion which lies laterally and exerts pressure chiefly on the extradural portion of the nerve root.

Clinical Course and Operative Treatment

The pathological studies of Schmorl have shown that the normal intervertebral disk mechanism is often disrupted and that extrusion of disk material may and does occur in many patients without causing symptoms. It is only when sufficient disk material is displaced posteriorly into the spinal canal to cause one or more roots of the cauda equina to be pinched that symptoms arise. It is doubtless true that many patients with this lesion are relieved by conservative measures. I have under observation one patient with a disk lesion, proved by lipiodol examination, who is perfectly comfortable if the spine is immobilized in a back brace or plaster jacket, but is incapacitated by severe pain if the support is discarded. If the pressure on one or more nerve roots is marked there will eventually be degeneration of the pain fibres and this symptom will disappear. As Foerster has shown, this may entail no peripheral anaesthesia, as section of at least two adjacent roots is necessary if anaesthesia in the dermatome is to be demonstrated. Manipulation of the back or forced straight leg raising under anaesthesia might relieve the pain of a ruptured disk by stretching and paralysing the pain fibres of the involved nerve root. There is danger, however, of precipitating a paraplegia by injudicious manipulation. This has occurred in two of our cases, one manipulated by an osteopath, the other by a qualified practitioner who thought he was dealing with a sacro-iliac subluxation.

Laminectomy without removal of the protruding mass of disk tissue might relieve symptoms by taking away one limb of the "nut-cracker" which is pinching the nerve root. Spine fusion, if done in a pain-free interval, might prevent recurrence of symptoms and, indeed, has probably been done many times on unrecognized cases of intervertebral disk lesions. Laminectomy and removal of the ruptured protruding portion of the disk is certainly the logical treatment for this condition if conservative non-operative methods fail. (Fig. 2, Special Plate.)

The operative removal of a ruptured disk requires laminectomy followed by a transdural or extradural removal of the disk fragment. If the lesion has been accurately localized by radiological examination the laminectomy need sacrifice no more than one or two laminae on one side of the spinous processes. The articular facets are saved if possible. The dura is usually opened in order to inspect the nerve roots and to remove the iodized oil. The ruptured fragment of disk tissue is generally found lying free beneath the posterior longitudinal ligament and compressed into a rounded mass, which can be seen to displace one or more nerve roots. Usually the most lateral root, anchored at its point of exit from the dura, rides directly over the mass. The root pressed upon may be flattened, and above the point of pressure there may be engorgement of the blood vessels and swelling of the root due to oedema. The larger ruptures may show complete occlusion of the dural sac and lack of pulsation of the dura below the point of pressure. When the posterior longitudinal ligament is incised the mass can be grasped by an Allis forceps and withdrawn. It tends to unroll, and looks like a piece of fascia or tendon when removed. A sinus which leads into the depths of the intervertebral space can always be demonstrated at the site of removal. When the extruded mass is taken away the displaced roots are seen to fall back into normal position.

There is a definite problem as to whether the spine should be fused over the laminectomized area. If an articular facet has been sacrificed, and if the patient is one who will on recovery lead an active life, we feel that the spine will be stronger if bone chips, supplemented with an osteoperiosteal graft removed from the tibia, are used to bridge the defect. This procedure need not prolong the operation more than a few minutes, as the tibial graft can be removed by a second team at the same time as the laminectomy is being done. The wound is closed in the usual fashion, after careful haemostasis, without drainage. If there has been no fusion the patient is kept recumbent in a firm bed for two or three weeks. If fusion has been done the patient is kept recumbent for four to eight weeks and a brace or jacket is continued for three to six months. Proper physiotherapy aids restoration of correct posture and muscular tone.

When examined microscopically the removed disk fragments may be found to consist wholly of normal nucleus pulposus or a fragment of annulus fibrosus, or of the elements of both. They in no way resemble chondromas or other neoplastic tissue.

Differential Diagnosis

As noted earlier in this paper, the typical case of ruptured intervertebral disk has a rather characteristic history and shows definite physical signs. The difficulty is that the mechanical low back strains often have this identical clinical picture. I have seen cases diagnosed as lumbo-sacral or sacro-iliac strain after careful examination by various clinicians of the highest repute—cases which were later found to arise from pressure of displaced intervertebral disk tissue on one or more roots of the cauda equina.

Almost every author, in his discussion of the differential diagnosis of low back pain and sciatica, stresses the necessity for ruling out cauda equina tumour, and details the cardinal reflex, motor, and sensory changes which accompany pressure on the cauda equina. A ruptured intervertebral disk may cause enough pressure on the cauda equina to produce obvious paralysis, anaesthesia, etc., but the majority of these cases have protrusions so located and of such size that only one nerve root is pressed upon and the only symptom is referred pain, all objective neurological signs being absent. We cannot accept a negative neurological examination as proof of the absence of this lesion. Neither can we accept the statement that a given case is a "classical picture" of sacro-iliac or lumbo-sacral strain. In either instance the actual pathology may be intervertebral disk pressure on a nerve root. As Love has said, "There are no physical, neurological, or orthopaedic signs which are found alone in cases of protrusion of intervertebral disks. All of the known signs may also be found in other conditions."

There are certain organic lesions of the low back other than tumours, probably rarer than rupture of an intervertebral disk, that need to be considered in the differential diagnosis. Arachnoiditis, characterized by matting together of the roots of the cauda equina, may cause intractable low back and sciatic pain, which is usually bilateral. Subarachnoid haemorrhage following trauma may be the cause of this condition. Lumbar puncture, if done in the area of fibrosis, will show the dynamic alterations of a complete or incomplete block, or it may be impossible to obtain fluid unless the needle is inserted at a higher level. The lipiodol examination is not characteristic, but an incomplete, very irregular slow filling or a block with an irregular margin is usually noted. (Fig. 7, Special Plate.)

A thickened ligamentum flavum may so constrict the dura as to produce pressure on one or more roots of the cauda equina. Spurling has recently drawn attention to this condition. Can it be due to localized extradural haemorrhage producing fibrosis and thickening of the ligament? Lipiodol examination usually reveals a constricted hour-glass type of filling defect on the posterior and lateral aspects of the spinal canal. (Fig. 6, Special Plate.)

Results

A total of eighty-three cases of lumbar intervertebral disk ruptures producing sciatic pain have been operated on at the Massachusetts General Hospital up to June, 1938. The immediate complete post-operative relief of the sciatic pain is commented upon by practically every patient.

The operation is of considerable magnitude, and should be undertaken only by competent surgeons after a thorough trial of conservative methods or after demonstration of the presence of a dangerous amount of pressure on two or more nerve roots. There have been two deaths in our series; both of these patients had severe irreparable nerve damage from large ruptured disks. There are three known failures. The rest of the patients are either entirely well or are very markedly improved.

Summary

Rupture or herniation of lumbar intervertebral disk tissue into the spinal canal causing pressure on one or more roots of the cauda equina is a well-established clinico-pathological entity, and is the cause of intractable sciatica in many cases. The lesion can be accurately localized by radiological examination after injection of iodized oil into the subarachnoid space. Laminectomy and operative removal of the extruded disk fragment give prompt and complete relief of symptoms in most of the cases.

BIBLIOGRAPHY

Barr, J. S. (1937). *J. Bone Jt. Surg.*, **19**, 323.
—— Hampton, A. O., and Mixter, W. J. (1937). *J. Amer. med. Ass.*, **109**, 1265.
Hampton, A. O., and Robinson, J. M. (1936). *Amer. J. Roentgenol.*, **36**, 782.
Kocher, Theodor (1896). *Mitt. Grenzgeb. Med. Chir.*, **1**, 415.
Love, J. Grafton, and Camp, John D. (1937). *J. Bone Jt. Surg.*, **19**, 776.
Middleton, G. S., and Teacher, J. H. (1911). *Glasg. med. J.*, **76**, 1.
Mixter, W. J. (1937). *Ann. Surg.*, **106**, 777.
Schmorl, Georg (1927). *Verh. dtsch. orthop. Ges.*, **21**, 3.
—— (1927). *Verh. dtsch. path. Ges.*, **22**, 250.
—— (1929). *Fortschr. Röntgenstr.*, **40**, 629.
—— (1931). *Arch. Orthop. Mech.-Ther.*, **29**, 389.
Spurling, R. G., Mayfield, F. H., and Rogers, J. B. (1937). *J. Amer. med. Ass.*, **109**, 928.

G. Bertoni and B. Melli (*Rif. med.*, 1938, **54**, 1526), who record twelve illustrative cases in patients aged from 12 to 35, state that Donaggio's reaction is performed as follows. If a certain quantity of ammonium molybdate is mixed with an equal quantity of normal filtered urine or cerebrospinal fluid, boiled, filtered again, and a watery solution of a basic aniline dye, such as thionin, is added, the colouring solution is completely precipitated by the molybdate and the fluid above the precipitate soon becomes quite clear. In some conditions, however, especially typhoid fever, the urine and spinal fluid acquire the property of checking or entirely preventing the precipitation of the thionin. This phenomenon has been shown by Donaggio to occur when the fluids in question contain a larger amount of organic colloid substances than normally. In typhoid fever the reaction becomes positive at an early stage and remains so throughout the course of the infection.

ORTHOPAEDIC ASPECTS OF SCIATICA*

BY

W. A. COCHRANE, F.R.C.S.Ed.

Lecturer in Orthopaedic Surgery, University of Edinburgh

In cases of sciatica a careful eliminative diagnosis leaves a group which is essentially orthopaedic. The physical examination is very important, and represents skilled interpretation of an aggregation of indirect signs which, taken together and supported by an understanding of the local anatomy and bodily statics of the part, can often point to a definite orthopaedic conclusion in the individual case and determine the proper treatment. This is the more likely to be the case if the examiner is able to interpret properly the evidence of stereoscopic films of the low back and pelvic joints.

Vulnerability of Fifth Lumbar Nerve

Orthopaedists try to explain sciatica largely on the basis of referred pain from the sacro-iliac and lumbo-sacral joints and their supporting ligaments. There is also the consideration which Putti has given to the funicular portion of the fifth lumbar nerve as it lies in the foramen. Situated as it is in this fibro-osseous canal, the fifth root, surrounded by a thick venous plexus, practically fills it. The walls of the canal are bounded posteriorly by the posterior spinal articulation, antero-internally by the intervertebral disk, and postero-externally by the lumbo-sacral and ilio-lumbar ligaments. The dorsal primary division of the nerve turns backwards to supply the sacrospinalis muscle, and in its course runs close to the lateral aspect of the posterior articulation, supplying the joint capsule itself. These relations make it possible to assert that the fifth lumbar nerve is in a position of peculiar vulnerability, as it may be affected by the action of trauma of the low back on the lumbo-sacral articulations and by inflammation of them also. It may also be affected by prolapse of the disk or by change in shape and size of the canal secondary to displacement of the fifth lumbar vertebra on the sacrum or to degenerative changes of the intervertebral disk. The slight margin of safety present in the asymptomatic individual by reason, I consider, of the competency of the normal muscular support is further jeopardized by anatomical variations of the lumbo-sacral region, which either cause increased motion at the expense of stability or, by reason of their asymmetry, produce abnormal stresses. In this connexion it is of interest to note that Steindler found anatomic variations in the lumbo-sacral region in 37 per cent. of a large group of cases of sciatica referred to the orthopaedic service.

Circumstances Leading to Sciatica

It may be submitted, then, that many cases of sciatica have their explanation in the operation of a chain of circumstances consisting of: (1) the special anatomic form of the patient, who is either of the unduly heavy or unduly slender build; (2) functional decompensation of the supporting structures of the low back, mainly muscular, often added to by advancing age, unsuitable occupation, increasing weight, debility, and a toxic factor, and leading to faulty posture with exaggeration of the normal lumbo-sacral angle. Such faulty and imperfect use, combined with degenerative changes in the disks and the presence of

* Read in a discussion at a joint meeting of the Sections of Neurology and Psychological Medicine, and Orthopaedics and Fractures at the Annual Meeting of the British Medical Association, Plymouth, 1938.

anatomical variations in the lumbo-sacral level, lays the subject open to repeated minor traumata affecting the articulations and their supporting ligaments. The trauma is often the precipitating factor, operating upon an area ill prepared to receive it. It is often a trauma which, if the individual had been a physically well-educated person posturally, would never, by reason of the functional and positional reserve of the parts concerned, have produced evil effects. No part of the body can be used wrongly without the rest of the body suffering, and, conversely, if one regards the problem only as a local one without reference to the re-establishment of correct use of the body as a whole, it is not easy to effect a permanent and satisfactory cure.

Restoration of Good Posture

In cases of sciatica, therefore, that are adjudged to be lumbo-sacral in type, regard has usually to be paid to the element of muscular fatigue associated with prolonged misuse, leading to an abnormal alignment of pelvis and lumbar spine. The low back becomes almost spastically fixed in this position, usually of increased lordosis in the subacute and chronic cases. While manipulation may assist such a case, it is often necessary and better to eliminate gravity, weight-bearing, and motion for a time by a period of several weeks of thorough rest in bed on a firm mattress. The patient lies on his back with a pillow beneath the head and knees. Thrice daily, for half an hour, the dorsal spine is thrown forward by placing a firm pillow beneath it, thus leaving the lumbar spine unsupported. Thrice daily he is rolled over, to lie face downwards on a pillow placed lengthwise beneath the trunk, and three hot fomentations, at ten-minute intervals, are placed on the low back. Weight and pulley traction of 10 lb. may materially assist in relieving the more acute symptoms. In about two weeks the muscles of the back lose their spasticity, and one may then make a posterior plaster-of-Paris shell for the trunk to lie in as a cradle. The time is then ripe for giving spinal massage, and instruction to the patient, in the lying-down position, in how to gain active conscious voluntary control of the muscles of the trunk. He is taught how actively to flatten the lumbar spine, to contract the side-abdominal muscles, and to breathe correctly, using the diaphragm with the chest elevated. He is fitted to a light back-brace which spans the lumbar curve when he gets up, and is taught how to maintain an improved posture, with a lengthened-out waist, when he stands, sits, and walks.

It needs an intelligent co-operative patient to do all this, but if the surgeon knows his business and applies the instruction himself there is usually no difficulty. The brace is discarded in due course, and the final test of recovery is the restoration of habitually good posture. One would emphasize the lack of understanding that exists in the country to-day as to what a trained orthopaedist should be able to do in the proper correlation of the structure and function of the body so far as the locomotory system is concerned. He is there to establish right use wherever there is wrong use; he must be trained, and able to apply in his practice his knowledge of the proper order in which re-establishment of correct use must be made. He must carry it out himself in the re-education of his cases, and not leave it to the physiotherapist. All phases of the treatment must be applied in their correct order. Rest without proper instruction in muscle balance later is of little value, as is the application of support while painful protective spasm of muscles is still present. Indiscriminate massage and exercises, often done at the wrong time, are all to be avoided as entities in themselves.

In no aspect of his work may the art of the orthopaedist be exercised to greater advantage than in the case of sciatica, occurring either apparently alone or in conjunction with low back pain. It is a specialty within a specialty, a field in itself.

In sprains of the sacro-iliac joint producing sciatica manipulation followed by firm protective strapping may have to be employed, but in these cases also it is not unusual for the muscles to be poor and the posture bad. Consequently they may need thorough rest, postural re-education, and support for a time after the manipulation has done its work.

Semi-sacralization of Fifth Lumbar Vertebra

In these cases of painful semi-sacralization the treatment detailed above will often succeed. In aggravated cases the effect of really prolonged rest in a well-fitted plaster-of-Paris spica has not infrequently been successful in my experience. It may be combined with traction of about 10 lb. to the affected leg. I have had patients who remain well after ten years and more following this method. There are cases of the sort which do require operation. Frequently they have had severe sciatica associated with painful affections of both the accessory lumbo-sacral articulation and the pelvic joint on the same side. The operation of spinal fusion is usually best in these cases, but one should not be in a hurry to operate on them. Far from it: if spinal fusion is to be performed, above all it must be certain that the fusion is done with the lumbo-sacral angle in the normal position and not in extension. I have had successful results by fusing the accessory articulation by a lateral Smith-Petersen approach, as for sacro-iliac joint arthrodesis, taking out the block of bone at a higher level, opposite the accessory joint. I consider this to be the least formidable type of operation for the patient. If required, the sacro-iliac joint could be fused at the same time.

Cases of Rheumatic Type

In regard to the cases which are of true rheumatic type accompanied by rheumatic fibrositis and myositis it is possible in certain cases to effect a cure by making an incision along the line of the posterior portion of the iliac crest, to detach the origin of the muscle and fascia there, and slide them down to a lower level. Heyman has rightly pointed out that such cases may closely simulate those of sacro-iliac pain, with referred neuralgic pain in the leg. Ober's operation of division of the contracted ilio-tibial band high up at its origin is also in this category.

Conclusion

Dr. Harris has rightly pointed out the importance of not neglecting to perform a rectal examination in all cases of difficulty in the diagnosis of sciatica. I well recall a case of very severe sciatica that had eluded diagnosis in which the cause was revealed forthwith by a rectal examination; it was due to an enormous abscess in the pelvis consequent upon the recrudescence of an old healed osteomyelitis of the iliac bone, the result of a bullet wound sustained fifteen years previously.

The fact that sciatica is rare in childhood and adolescence is of decided significance in explaining its aetiology on a basis of a strong muscular reserve of support to what is, after all, potentially rather a weak

part of the body—that is, the lumbo-sacral region of the spine. The penalties of the upright position are many, and this is one of them.

I must not close these remarks without paying a tribute to the Boston school of orthopaedic surgeons for the work they have done on this subject. It is due to them, and chiefly to Goldthwait, that a proper system of examination has been established and that these cases, so far as the orthopaedic aspect of them is concerned, are now capable of scientific analysis, classification, and treatment.

THE XENOPUS PREGNANCY TEST

BY

EDWARD R. ELKAN, M.D.

(WITH SPECIAL PLATE)

The discovery of what is now known as the xenopus pregnancy test is based on experiments conducted by Hogben (1930, 1931), who observed that hypophysectomy produced ovarian retrogression, and the injection of anterior pituitary extracts ovulation, in the female South African clawed toad. Further experiments on these lines were carried out by Charles, Slome, and Zwarenstein in Capetown, and later by Bellerby, Zwarenstein, and Shapiro in London, and it is due to the collaboration of these authors that the initial difficulties which stood in the way of a standardization of the xenopus test were overcome. This is particularly true with regard to Bellerby's work on the laboratory conditions necessary for sustained reproductive activity, which work made it possible to improve greatly the reliability of xenopus as a test animal. While there has so far been no difficulty in obtaining regular supplies of these toads from South Africa our next aim must nevertheless be the breeding of xenopus in this country. Bles attempted this as early as 1905, and sporadic successes have been recorded by other authors (Bles, 1906); Bellerby, 1933; Vanderplanck, 1935; Elkan, 1938). It is to be expected that in the near future we shall have not only a standardized xenopus pregnancy test but also a standardized method of breeding this animal.

Weisman (1938) recently reviewed the tests for the detection of early pregnancy which have been devised since Aschheim and Zondek's discovery eleven years ago. Apart from the Aschheim-Zondek reaction only Friedman's technique has become widely popular; the xenopus test, though in some points superior to both the Aschheim-Zondek and the Friedman techniques, has remained more or less unnoticed despite the enthusiastic reports which have appeared in various journals in recent years. These three pregnancy tests are the only ones to deserve, in Weisman's opinion, the term "excellent." In the course of the last twelve months I have done 295 xenopus tests on 2,112 toads, and I fully endorse Weisman's judgment. Some of the objections to this test raised by earlier observers seem to have become invalid, and as the early detection of pregnancy remains important from the psychological and the gynaecological points of view a method which allows the diagnosis to be made within a few hours should be welcome.

Biological Considerations

Xenopus laevis Daud., a toad of the genus Aglossa, is fairly common in all the tropical parts of Africa (Fig. 1, Special Plate). The toad is exported from Capetown, where the animal dealers seem to have no difficulty in catching as many as are required. My own experience with these exporters does not confirm fears expressed by Crew (1937) and Weisman (1938) as to the availability of the animal. So far supplies seem to be unlimited and export unrestricted, and since the animals survive the passage from Capetown to London I see no reason why they should not be shipped to any part of the country. I have at present tadpoles in my laboratory bred in an open-air tank this summer. It remains to be seen whether these tadpoles can be brought up in sufficient numbers and whether their growth is rapid enough to make the breeding of xenopus an economic proposition. My present tadpoles look very much like young fish. They stand on their heads most of the time, and feed on a mixed diet of infusoria, particularly flagellates, and raw liver emulsion, of which a little is poured into the aquarium every day.

The adult clawed toads received from Capetown vary greatly in size, the smallest ones measuring 2 inches, the largest 4¼ inches, from mouth to anus. I find those of medium size most suitable for tests. The small toads are mature, but do not stand the injections so well; the larger specimens tolerate the injections well, but they require very big jars for observation. It is easy to distinguish the males from the females. They are identical in colour, but the external opening of the cloaca in the female has three labia—two dorsal and one ventral—which do not, however, form a receptaculum for semen; these labia are absent in the male (Fig. 2, Special Plate). Fully grown males do not reach the same size as fully grown females. The females also acquire a characteristic shape through the bulging lungs being pushed aside by the ovaries, which protrude on both sides of the abdomen like cushions.

The animals are easy to feed. They will accept daphnia, earthworms, newts, tadpoles (*Rana esculenta*), minced meat, or minced liver, but flatly refuse to touch bread or potatoes. It is a little difficult to say authoritatively how often they should be fed. They will certainly accept food every day, but they never show any signs of being particularly hungry, and if not fed for a week they do not seem to be the worse for it. If they grow at all in the laboratory they do so extremely slowly, even if they are well fed. It is wiser not to feed those specimens which are to be used for tests in a day or two. The animals have a short alimentary canal. They eat whenever they happen to come across anything edible, but do not seem to make much use of what they have eaten. The water becomes dirty from their excreta soon after they have been fed, and must then be changed. It does not seem to matter—at least so far as the tests are concerned—whether feeding takes place once, twice, or three times a week if only the animals are given as much food as they will accept at each feeding time.

During the cold season all the animals are kept at the laboratory in a specially constructed tank, and at a temperature of 23° to 26° C. In the summer only the animals actually needed for tests are kept in the laboratory. The others, particularly those who are having their "resting time," are kept in outdoor tanks, where they become comparatively tame; when it rains they can be seen leaving the water and climbing on to stones provided for them. Hundreds of xenopus can be kept in a comparatively small space, and since the females of this species do not make any noise their presence is not a nuisance to the neighbourhood.

I cannot yet answer a question often asked by visitors: How long do these animals live, and how often can they be used for tests? I have lost a few during the winter from a disease which I cannot diagnose; it causes paralysis of the hind legs so that the toad cannot come up to the surface to breathe, and is consequently drowned if not rescued in time. This condition affected both males, which are not used for tests, and females, but almost disappeared with the approach of the warm season. The toads frequently suffer from an infection with taenia, but I have been unable so far to ascertain if these tapeworms are the cause of these sporadic losses. Toads very rarely die in the course of a test; some of my earliest arrivals must have been used three or four times without showing any signs of weakness. I keep the toads mixed, so that arrivals of all ages are used in each test.

A statement made by Zwarenstein and Shapiro (1934) that toads which have been kept under laboratory conditions undergo a process of "desensitization" and can no longer be relied on after three to four weeks has since been repeated by Crew (1937) and Weisman (1938), and is one of the reasons why workers in this field have been slow in taking up this otherwise useful and reliable test. I cannot endorse this statement from my own experience. I have received consignments of toads from South Africa with the animals' ovaries in a state of quiescence. This may be identical with the state of "desensitization," but after these animals had been well kept and fed for three to four weeks they gave reliable results. Others gave reliable results from the day of arrival. A study of Bellerby's papers (1929, 1933, 1938) on the biology of these toads may explain this puzzling behaviour. In my experience no desensitization takes place in these animals if properly kept, and I see no reason why toads should not be used again and again so long as they are allowed proper resting periods between tests. (See Fig. A.)

FIG. A.—Dissection of a female *Xenopus laevis* which was kept in captivity for over six months and then killed after having given a positive pregnancy test reaction. Note the well-developed ovaries and oviducts and the absence of any signs of degeneration of the reproductive system.

The Pregnancy Test

The xenopus test, like all other biological pregnancy tests, depends on the response of the animal's gonads to anterior-pituitary-like hormone present in the urine of pregnant women. I am not quite sure as to the correctness of the term "anterior-pituitary-like," because I have tried commercial pituitary extracts in considerable doses without obtaining a response in these toads. Further experimental work will be necessary to show if the toads react in the same way to anterior pituitary extracts, extracts from serum, and extracts made from urine. The mature female ovaries contain hundreds of eggs in various stages of development. Under the hormonal stimulus numerous eggs enter the oviducts (ovulation) and are discharged from the cloaca (oviposition). Under normal conditions these eggs, which are covered with a sticky gelatinous mass, are one by one fertilized by the male as they leave the cloaca and are then stuck on to water plants by the female. In the test the eggs fall through a platform to the bottom of the test jar, where they can easily be seen with the naked eye (Special Plate, Fig. 3).

The test proper starts with the collection of the urine. It seems wise to limit the patient's intake of fluids so far as possible on the day before collecting the specimen. She thus concentrates her own urine and thus increases the reliability of the test; no drugs should be administered during this period. Some 6 oz. of morning urine are collected in a clean—not necessarily sterile—bottle and sent to the laboratory. Here the investigator can easily determine whether his directions have been followed or not. Not infrequently the patients drink quantities of Vichy water or tea to be sure that they produce the necessary amount of urine in the morning. An estimation of the specific gravity allows these valueless specimens to be discarded. Personally, I do not expect reliable results from urines with a specific gravity below 1015; figures from 1020 to 1030 are desirable. Slight turbidity is not important, but if the urine is very turbid it should be filtered.

For the test itself untreated urine or an extract made by Zondek's alcohol and acetone precipitation method may be used. Bellerby (1933) thinks that the process of ovulation follows quantitative rules and does not depend on a "trigger action." I am not convinced that this can be accepted as a general rule, since I see every day that different toads injected with exactly the same dose of extract lay very different numbers of eggs. Crew (1936) uses extracts only and does not regard as reliable tests with untreated urine. I, too, have seen negative results from untreated urine and positive results on using extracts of the same urines, but in other cases both methods have given positive results, and I could find no constant relation between these latter results and the stages of the respective pregnancies. More experimental work is needed to clarify this point. The use of untreated urine would seem more economical, and in addition we do not know how much hormone becomes denatured in the course of the precipitation and concentration. However, since Zondek's method affords a certain means of concentration, and since we want to make the test as reliable as possible, this method seems at present the better one. This does not mean that tests with untreated urine cannot be perfectly reliable, and some laboratory workers might find it best

to test untreated urine first in all cases, and to test a second time with the extract only in those cases in which untreated urine gave a negative finding.

Technique of Testing

For the test 2 c.cm. of untreated urine or 1 c.cm. of extract is injected into the lymph sac under the dorsal skin of as many female toads as one cares to use. Some observers inject into the leg or into the peritoneal cavity. The toads are slippery and difficult to hold; I find that the easiest way of dealing with them is to hold them in a coarse meshed net and to inject through the meshes. There is no immediate reaction to ordinary urine. If extract is used which still contains a trace of alcohol or acetone the toads react by secreting mucus from the skin glands in the neighbourhood of the injection. The question of the "toxicity" of the urine seems to arise very rarely. Specimens which had been in the post for several days have been tested, and while I am not sure that the hormone content remains constant in such specimens they seem to do no harm to the animals.

After the injection has been given the toads are put into test jars (Special Plate, Fig. 3), where they sit on perforated platforms, so that they have no chance of eating their own spawn. This may be an unnecessary precaution. I have left toads in their jars for days and have never seen them eat their spawn; in fact, as a reaction to the close confinement, which they seem to dislike, they vomit up everything they have eaten shortly before the test. It is for this reason that Bellerby (1929) prefers to leave unfed for a full week those toads he is going to use for tests. I have a strong suspicion, however, that the xenopus when at liberty is cannibalistic. A male and a female left in a breeding tank for a few weeks this summer produced only three tadpoles; since it is unlikely that the female should have laid only three eggs my suspicion is, I think, justified.

During the test the jars are kept at a temperature of 26° C. The shortest time I have so far observed between injection and oviposition was four hours and fifty minutes, the longest twelve hours. Figures midway between these two extremes are more usual. I have no definite proof as to whether the concentration of the hormone in the extract or the temperature at which the animals are kept during the test has anything to do with the reaction time, since of a group of toads used for one test no two ever start laying eggs at the same time. While the hormone concentration and the temperature are certainly of some importance in this respect, the animals themselves may provide a third factor which we cannot at present determine.

The eggs—little round balls, half black, half white, and of about 1 mm. in diameter—are covered with a sticky gelatinous substance. Normally these animals do not lay their eggs in bulk but distribute them over a wide area, sticking them on to water weeds one by one. In the test jar the eggs either stick to the underside of the platform or fall to the bottom of the jar. Their number varies enormously. Anything from five to six eggs upwards can be counted as a positive reaction. Tests in which only one or two eggs have been laid by one or two toads should be repeated. They will usually be found to be negative. In the absence of males these eggs are, of course, unfertilized. It should be emphasized that spontaneous ovulation in this species does not take place in captivity or under laboratory conditions. Females, even if kept under the best possible conditions, will never ovulate except in the presence of a male. It is difficult enough to obtain fertilized eggs even if the males and females are kept in a special aquarium. After many unsuccessful attempts, I have recently succeeded in obtaining a batch of about 200 tadpoles, but I had to inject the female with pregnancy urine extract to induce ovulation.

If nothing is known about the stage of the presumed pregnancy or if the urine comes from a patient who has not yet missed her period an extract is made by Zondek's method. The technique is as follows:

METHOD OF EXTRACTION

Sixty c.cm. of filtered urine are acidulated with acetic acid and mixed in a separating funnel with enough alcohol and/or acetone to bring down a precipitate. The quantity of alcohol or acetone necessary varies from 150 to 300 c.cm. It seems that in some cases an excess of alcohol redissolves the precipitate. The alcohol should therefore be added slowly and only up to the point of maximum turbidity. The mixture is then shaken vigorously for a few minutes and centrifuged. If no centrifuge of sufficient capacity is available the precipitate may be allowed to settle; it can be separated off after thirty minutes, and must then be centrifuged thoroughly to free it from the alcohol–urine mixture. It is important to get rid of as much of the alcohol as possible because it has an unfavourable effect on the toads. It makes no essential difference whether alcohol or acetone is used to bring down the precipitate. Acetone is the more expensive, but it is useful in so far as it brings down precipitates from very dilute urines and, after centrifuging, leaves a residue much "drier" than that which can be obtained by alcohol precipitation. When the precipitate has thus been separated from the alcohol–urine mixture it is stirred up and shaken vigorously with distilled water (1 c.cm. for each animal injected) and glass beads. This mixture is again thoroughly centrifuged and the supernatant fluid is used for injection. The whole procedure takes perhaps 20 minutes. As for the choice of a centrifuge I have found that the small clinic model with a 1/16-h.p. motor is not sufficiently strong. A larger model with a 1/8-h.p. motor is preferable; this should be fitted with 50-c.cm. buckets and attain a rate of at least 3,000 revolutions a minute.

In the ordinary routine work the animals are injected within an hour of the urine being received. They are left in their test jars overnight and the results are read the next morning. During the test the jars should be kept at about 26° C.; in the absence of a suitable incubator this can be done by putting the jars back into the tank. The patient knows the result of the test in less than twenty-four hours. The animals, after the result has been read, are kept in the resting tank for a week if the test was negative, for a month in the case of a positive test.

Reliability of Xenopus Test

Among the 295 tests which I have done so far and in which 2,112 frogs were used I have not seen one clear positive that did not indicate a pregnancy. There were a few negative results which when repeated after a fortnight became positive, but I do not think that these can be regarded as failures. What we test is the hormone concentration in the patient's urine. If the urine is sent in for examination at a time when no hormone or only a trace of hormone is present the test naturally appears to be negative. Nor would it seem advisable to make the test too "sharp" by using methods of extreme concentration. The normal urine of a non-gravida contains a varying amount of anterior pituitary hormone. If the test is too "sharp" it may fall within the limits of the normal hormone concentrations, which vary in different women and are not necessarily constant in any one patient. It would seem better only to test urines from

women who have gone at least two or three weeks over the first "missed" period. By that time the concentration of hormone in the urine has always risen so far above the normal that no false negatives need be feared with the ordinary extraction method.

The tests I have performed myself are still too few to allow any final conclusions being drawn. Disregarding my first ninety tests, the results of which may have been influenced by the fact that I was learning the method, I can report that of the next 150 tests sixty-two had a positive and eighty-eight a negative result. No clear positive was found to be incorrect; of weak positive results, which as experience has shown must be counted as negatives, there were ten. Of negatives that became positive at a later date there were three.

These 150 tests were done on 742 toads. Of these, 734 survived the test without apparently being the worse for it. Eight toads died in the course of tests—four during negative and four during positive tests. A number of toads which were not counted, as their deaths obviously had nothing to do with the tests, some of them being males, died during the winter. I do not think that their number exceeded thirty.

Summary

The xenopus test allows a diagnosis of early pregnancy to be made within less than twenty-four hours.

No animals need be killed to obtain the result.

The reliability of the test does not seem to differ from that of the Aschheim-Zondek or the Friedman reaction.

The technique of this test is comparatively simple and very suitable for experimental work on the anterior-pituitary-like hormone of pregnancy.

My sincere gratitude is due to Mr. D. P. Gould of Loughton and Mr. R. Milton for their interest and helpful collaboration in my experiments with xenopus.

BIBLIOGRAPHY

Alexander, S. S., and Bellerby, C. W. (1935). *J. exp. Biol.*, **12**, 306.
Bellerby, C. W. (1929). *J. Physiol.*, **67**, Proc. XXXII.
—— (1933). *Biochem. J.*, **27**, 2022.
—— (1938). *J. exp. Biol.*, **15**, 91.
Bles, E. J. (1906). *Trans. roy. Soc. Edinb.*, **41**, 789.
Bosman, L. P. (1937). *British Medical Journal*, **2**, 939.
Brehm, A. E. (1912). *Tierleben*, **4**, 174, Bibliogr. Instit. Leipzig and Vienna.
Crew, F. A. E. (1936). *British Medical Journal*, **2**, 1092.
—— (1937). Ibid., **2**, 1044.
Elkan, E. (1938). *Practitioner*, **140**, 312.
Hogben, L. T. (1930). *Proc. roy. Soc. S.A.*
—— Charles, E., and Slome, D. (1931). *J. exp. Biol.*, **8**, 345.
Shapiro, H. A., and Zwarenstein, H. (1933). *Proc. roy. Soc. S.A.*, September 20.
—— —— (1935). *S.A. med. J.*, **9**, 202.
Vanderplanck, F. L. (1935). *Aquarist*, May-June.
Weisman, A. I. (1938). *Amer. J. Obstet. Gynec.*, **35**, 354.
Zondek, B. (1935). *Hormone des Ovariums und des Hypophysen-Vorderlappens*, p. 567, Vienna, Springer.
Zwarenstein, H., and Shapiro, H. A. (1933). *J. exp. Biol.*, **10**, 372.
—— —— (1934). *Nature*, **133**, 762.

The Henry Saxon Snell Prize was founded to encourage improvements in the construction or adaptation of sanitary appliances, and is awarded by the council of the Royal Sanitary Institute at intervals of three years. The prize in the year 1939 will consist of fifty guineas and a silver medal, and is offered for an essay describing suggested improvements in the construction or adaptation of sanitary appliances. Particulars may be had from the Secretary, Royal Sanitary Institute, 90, Buckingham Palace Road, London, S.W.1.

USE OF THE SKIN OF THE FEMALE BREAST IN PLASTIC SURGERY

BY

J. F. S. ESSER, M.D.

(WITH SPECIAL PLATE)

As the breasts of many women and girls, particularly in countries abroad, are inclined to be too much developed, and the weight of these large glands stretches the surrounding skin, it is sometimes a great advantage to get rid of the superfluous skin, fat, and gland tissue.

Having thought this over seriously, I have for some twenty years advocated the use of this skin for various purposes to supply missing portions. The importance of this from an aesthetic point of view is generally recognized, but few people are aware of the suffering caused by the weight of these heavy glands. Even when not abnormally developed they may be so mobile as to cause serious inconvenience to their possessors, especially where sport is concerned.

Advantages of the Method

It seemed logical to me, therefore, to combine the necessity for supplying skin for surgical purposes with the advantage of reducing overdeveloped glands. I carried this idea further by using not only superabundant skin but even skin of normal breasts which could be taken away without causing any damage. One of the greatest advantages of the method is that the glands are often very mobile and the pedicled flaps taken from them can be easily brought to and be used in remote parts. In several instances I employed the skin for covering amputated stumps of the legs, even beneath the knee, as the legs and breasts can be brought into apposition, and also for plastic surgery of the hand and the arm. On one occasion I made practical use of it on a girl who was a pianist and who was unable to pursue her career because of the scar tissue occupying the whole surface of the inner part of the lower arm, the result of serious inflammation with suppuration and necrosis. After removing all the scar tissue I succeeded in making the articulations and muscles mobile, and in covering the gap completely with a large pedicled flap taken from the breast. In her case the skin of the breast was not sufficient to enable me to close the secondary gap on the gland with the remaining skin, so I had to fill in the gap with the help of an epithelial inlay. Epithelial inlay is a method I introduced in plastic surgery, and is so widely used that I need not here enter into all the details concerning it. I will only say that it consists in taking a mould, with Stent's composition, of wounds which have to be covered by free skin grafts. This mould is wrapped in a Thiersch graft and replaced on the wound exactly as it was when taken, and is kept pressed on it for a week.

The flap on the arm healed completely, and the layer of fat in the flap helped to keep the muscles and tendons of the arm mobile: these had lost their surrounding protective tissue and would have formed scars with the skin flap if the layer of fat had not separated them. The patient was able afterwards to continue her career successfully, and the breast had not suffered. The following are other cases in which the method was employed.

Case I

This patient was run over, and had lost both her legs. They were amputated above the knee-joints, and the skin could not be joined over the right-hand stump. The result was that after further healing the right stump cicatrized conically, while two inches of bone protruded. Professor Borchardt consulted me for this case.

It is obvious that it was of special importance to the patient to keep the entire length of both stumps, as a second amputation and further shortening would doubtless have seriously impaired the control of the artificial limb and the balance in walking. Though there was no chance of taking the necessary skin from the other leg, as is my usual practice, the principle of never amputating a second time in such cases was maintained.

By a coincidence the mamma afforded the necessary help. The patient gave birth to a healthy child in the hospital some months after the accident. Owing to the plentiful milk secretion the mammae were highly hypertrophic, and from their excessive prominence almost invited their use. Instead of cutting out a flap of skin for covering the amputated stump I inserted the stump deeply into the breast, after removing the outer layer by the osteotome and cutting away the scarred skin. The newly cut skin edge of the stump was sewn up to the edge of the incision in the mamma all the way round. As the length of the cut was calculated exactly, the wound was thus completely closed. Fig. 1 (Special Plate) shows the patient with the stump inserted in the mamma, after the wound had primarily healed and the plaster bandage had been removed. The skin and some of the tissue of the mamma adhered firmly all round the bone.

In a second operation, thirty-seven days after the first, almost the whole of the lower half of the mamma, including a thickish layer of glandular tissue, was cut off along with the amputation stump. This flap when sewn up was sufficient to cover the bone completely (Fig. 2). The wound in the mamma was closed by a plastic operation so that the remaining skin of the mamma and the rest of the glandular tissue were equally distributed over the new and smaller mamma. The asymmetry of the breasts could be remedied at the patient's wish later on by diminution of the larger one. It may be mentioned that the position during the process, although not exactly pleasant, was not so entirely strained and unnatural as one might imagine. The photograph in which the plaster bandage has been removed shows that since pressure was not required to keep the leg in position no tension has resulted. This is explained by the fact that the coxa only affords a portion of the necessary flexion, as the spina dorsalis, which bends easily, plays a great part in it. I should like to mention that the glandular tissue transplanted to the stump could be seen secreting milk out of the open seam for some weeks after the severance.

Case II

This patient, a girl aged 19, was run over in Amsterdam by a tramcar, and her right leg had to be amputated three and a half inches below the knee. The end of the amputation stump did not heal well, and I was called in. A tibial ulcer had appeared between the scars. I am, on principle, opposed to reamputation if it is not vitally essential, so I resected all the scar tissue and placed almost the entire mamma, pedicled at its upper and inner side, on the large wound of the stump. The girl's breast was not quite large enough to cover it, as I had previously taken away the greater part of the stump covering as far as the patella, all this skin tissue being scarred.

The great value of this operation lies in its preservation of the knee-joint for moving the artificial limb. The skin of the breast in the above cases has proved, as in other similar cases on which I operated, strong enough to bear the weight of the body supported by the artificial limb. I wish especially to call attention to the fact that in general all transplanted skin flaps on stump ends must be very carefully treated until full sensibility of the flap has developed.

Case III

This patient was a young woman in Budapest to whose case I was called in. She had lost the middle three fingers and a part of their metacarpi, especially that of the index finger. This accident had occurred in the large cutting machine of a hospital kitchen. The wound healed, but the thumb was completely immobilized and had grown into the hand-stump. I cut away all scar tissue and made the thumb completely mobile, leaving a large wound on the stump of the hand and on the thumb. This large wound was placed in an incision made in her over-developed right breast. The hand remained there during four weeks. The result is shown in Fig. 3 of the Plate.

On several occasions I have healed large burns on the neck by means of pedicled mamma flaps, as well as various mutilation scars due to suppurated scrofulous glands or to other suppurations, and to necrosis of the tissues. It often happens that not only skin but fat and muscle tissues are destroyed by these suppurations.

It is possible to repair not only the lower portion of the face by means of pedicled mamma flaps, but also the upper part, even the whole forehead. I have successfully performed these operations, and in one case I restored the entire skin of the face, including the whole of the forehead, with a pedicled breast-flap. Even though these operations were entirely successful, I wish to point out that, technically, they are the most difficult forms of plastic surgery. On the other hand, the treatment of the chin is comparatively easy, particularly if the breast is very mobile.

In one case I was called in by Professor Borchardt, in Berlin, to operate on a woman aged 40 who had a large blue angioma which looked like a bunch of grapes covering the whole of her chin. I removed the tumour and made a new chin out of a pedicled breast-flap. The result was exceptionally good: her face became quite normal, and remained so. She was very grateful, but said how much she regretted not having met me before, as she had lost a possible chance of marrying and of having children. She also told me that she previously only went out at night, and was not admitted to a hotel for fear of frightening the guests by her appearance.

I will mention another operation, one of amputation of the arm, in which the pectoral muscle is perforated by a tunnel covered with skin procured from a pedicled breast-flap. The secondary gap is sewn together. The object of this tunnel is to hold the artificial limb in place and to move it with the help of a tunnel in the trapezius muscle. Pins must be placed in the tunnels and attached with strings to the artificial limb. If they are only to hold the artificial limb the strings are fixed to the end of it; if they are to move the artificial limb they must be fixed to the part of it which has to be moved.

Monaco.

A conference between the Minister of Health and representatives of local authorities on the Cancer Bill took place on December 7, when Dr. Walter Elliot received members of the London County Council, the County Councils Association, and the Association of Municipal Corporations. Various aspects of the Bill, both financial and administrative, were discussed, and the position of London and the other authorities which will have responsibilities under the scheme was further clarified. The Minister undertook to consider various representations which were made to him.

BEHAVIOUR OF TUBERCULOUS CAVITIES IN THE LUNG UNDER ARTIFICIAL PNEUMOTHORAX TREATMENT

BY

LAWRENCE ROBERTS, M.D., M.R.C.P.
Assistant Medical Officer, Papworth Village Settlement

AND

W. PAGEL, M.D.
Sims Woodhead Memorial Laboratory, Papworth Village Settlement

(WITH SPECIAL PLATE)

Tuberculous cavities in the lung may react to collapse treatment in several different ways. The case which follows illustrates three such reactions within the same lung.

It has been suggested by Coryllos (1936) that collapse and disappearance of such cavities are often due to obstruction of the draining bronchus, but objective evidence of this is still rare. In the present case such a sequence of events occurred, and the bronchial obstruction and the partially healed cavity were demonstrated at necropsy.

Case Report

The patient was a married woman aged 25, a housewife in a small village. She had no children. She felt quite well until November, 1936, when a slight morning cough with sputum started. Shortly after this a little blood was noticed in the sputum, but was ignored. In January, 1937, she began to feel progressively more tired and languid, and the cough became more marked. In April, 1937, she saw her doctor, who diagnosed pulmonary tuberculosis. This was confirmed by *x*-ray examination, and the sputum was found to be positive for tubercle bacilli. She rested at home for eight weeks, and was admitted to Papworth in June, 1937.

Her general condition at this time was fairly good. She was strongly built and of good colour, but there had been some recent loss of weight. Her temperature was normal. There was a slight cough, with two drachms of sputum a day. On examination the only abnormalities found were in the respiratory system. There was drooping of the right shoulder and diminished expansion of the right side of the chest. Impairment of the percussion note and moist rales were observed over the upper half of the right lung, with signs of cavitation in the middle zone posteriorly. Over the left lung rales were present at the apex both anteriorly and posteriorly. The sputum was positive for tubercle bacilli, and the blood sedimentation rate was 22 (Westergren; one hour).

X-ray examination (Plate, Fig. 1) showed well-marked fibrocaseous tuberculosis in the right lung with at least two cavities and many calcified foci. In the left lung there was a little infiltration in the subclavicular region. (Nothing noteworthy occurred in the left lung during the evolution of the case: for the sake of clarity, therefore, further description of the left lung is omitted.)

A right artificial pneumothorax was induced on July 9. The patient soon felt very fit and well, gained a stone in weight, and maintained a normal temperature. A little cough and sputum persisted, however, and the latter remained positive for tubercle bacilli. On one occasion there was slight haemoptysis. Fig. 2 shows the state of affairs on September 28, 1937. A new cavity (A) had appeared at the right apex opposite the attachment of an adhesion. The smaller of the two original cavities (B) seemed to have undergone concentric shrinking, but an adhesion was present here also. The large cavity (C) was smaller than before, but was surrounded by a well-marked ring of opacity. It was not clear whether this indicated an inflammatory reaction or a zone of atelectasis. The pneumothorax was continued with some caution. During the next two months the general condition further improved, the temperature remained normal, and the sedimentation rate dropped to 11. The sputum continued, and was still positive. An *x*-ray film taken on November 24, 1937 (Fig. 3), showed cavity A to be larger than before; B was little changed, but C was much less obvious and the ring of opacity had entirely gone. This suggested that the opacity had been due to atelectasis, after which collapse of the cavity occurred.

In the same lung, therefore, one cavity was closing, one stationary, and a third enlarging, all under the influence of different factors. The pneumothorax was maintained and thoracoscopy was done by Mr. J. B. Hunter, as many adhesions as possible being divided. An *x*-ray film taken on February 24, 1938 (Fig. 4), showed the apparently excellent result of this: no cavitation could be seen in the lung at all. As is well known, however, disappearance of a cavity from the skiagram is not synonymous with healing. On March 6 rupture of the right lung occurred, followed by tuberculous pyopneumothorax. Despite treatment the patient steadily became worse, and died on May 29 of an acute bronchopneumonic spread in the left lung.

Necropsy Findings

At necropsy the pyopneumothorax was found to be due to rupture of cavity A, which was slit-like and communicated freely with the pleura by a caseous track (Fig 5, A). The cavity measured one inch by one-eighth inch, and the draining bronchus was patent. Cavity B no longer remained, but a solid round focus half an inch in diameter was found in this situation (Fig. 5, B). Cavity C resembled a small cylindrical bronchiectatic cavity (Fig. 5, C), and at the commencement of the draining bronchus a plug was found. This was attached to the bronchial wall and filled its lumen, and projected also into the lumen of the cavity. In the left lung a pea-sized cavity was present in the upper lobe, and there was a recent bronchogenic spread in both lobes, which was the immediate cause of death.

Histologically, cavity A was thin-walled and lined by a layer of caseous material containing a few acid-fast rods. This caseous layer extended proximally into the draining bronchus at its beginning and distally along the fistula right out to the pleura. Around the cavity was collapsed lung parenchyma. This cavity therefore showed no signs of healing, but was merely relaxed following collapse of the lung. The solid round focus was devoid of air. It consisted of true caseous material, and, as already stated, was situated in that part of the lung formerly occupied by cavity B. Cavity C (Fig. 6) was small and had very thin walls, being directly surrounded by collapsed alveolar tissue (Fig. 6, A). A few pieces of caseous material were attached to the walls, and one such piece (Fig. 6, P) plugged the draining bronchus at its beginning (Fig. 6, *b*). Caseous bronchitis was present for a short distance beyond this plug.

Commentary

The chief interest of the case centres round cavity C. Vere Pearson (1930) pointed out the significance of bronchial obstruction in the pathogenesis of pulmonary cavities. Coryllos (1936) carried the matter further, suggesting that the most important factor in cavity healing is the closure of the draining bronchus, which leads to collapse of the cavity, absorption of the air, and inspissation of the contents, if any. Objective proof of this, however, is still rare enough to be worth recording. Graeff (1935) has reported one case of a completely healed cavity with closed bronchus, but it is impossible to say here whether closure of the bronchus or closure of the cavity was the primary event.

The value of the present case lies in the fact that a certain sequence of events was observed clinically: atelectasis—swift collapse of a cavity—disappearance; that before the sequence had reached its end-point—

that is, complete healing of the cavity—death occurred from another cause; and that at necropsy the sequence was found to be caused by bronchial plugging. Fig. 6 shows the plug in position. It consists of compact caseous material, and must have been in place for several months.

Closure of the draining bronchus is not always followed by collapse and shrinking of the cavity. Salkin, Cadden, and McIndoe (1936) concluded that this happens only when the cavity walls are not very rigid, and when the surrounding lung tissue retains enough of its elasticity. Closure of a cavity may be due to mechanisms other than bronchial obstruction—for instance, to concentric shrinking followed by epithelialization while the bronchus remains open (Pagel, 1932; Alexander, 1935).

It has often been noted, of course, that healed cavities may appear as solid or even calcified foci in the skiagram, but pathological evidence of this is not common. Graeff (1935) has reported a good example, and several others have been described by Pagel and Simmonds (1938).

The various mechanisms of cavity healing have recently been reviewed by Marienfeld (1937) and Pinner (1937).

It is instructive to note that cavity A showed no signs of healing whatever: its walls were merely relaxed following collapse of the lung. This emphasizes the fact that some parts of a diseased lung may steadily improve under collapse treatment, while others may remain actively diseased and lead to the death of the patient.

Summary

The recorded case of treatment by artificial pneumothorax shows: (1) Collapse and shrinking of a cavity due to obstruction of its bronchus. (2) Conversion of a second cavity into a solid round focus. (3) Relaxation of a third cavity without any resultant healing.

REFERENCES

Alexander, H. (1935). *Beitr. klin. Tuberk.*, **86**, 429.
Coryllos, P. N. (1936). *Amer. Rev. Tuberc.*, **33**, 639.
Graeff, S. (1935). *Ergebn. ges. TuberkForsch.*, **7**, 257.
Marienfeld, O. (1937). *Papworth Res. Bull.*, **1**, 92.
Pagel, W. (1932). *Beitr. klin. Tuberk.*, **79**, 383.
—— and Simmonds, F. A. H. (1938). *Amer. J. med. Sci.* (in press).
Pearson, S. Vere (1930). *British Medical Journal*, **1**, 380.
Pinner, M. (1937). J. Alexander's *Collapse Therapy*, New York.
Salkin, D., Cadden, A. V., and McIndoe, R. B. (1936). *Tubercle*, **18**, 71.

P. Blasucci (*Minerva med.*, 1938, **29**, 493) gives the following statistics of seventy cases of urethral stricture. The ages ranged from 7, in a boy in whom the stricture was due to trauma, to 81, in a syphilitic man suffering from an enlarged prostate. The average age was 53. Fifty-five patients gave a history of gonorrhoea, which in the earliest case had been contracted at the age of 13. Trauma was responsible for 10 per cent. In the remaining 10 per cent. the aetiology was doubtful. Fourteen showed clinical or laboratory evidence of syphilis. Nineteen gave a history of the exact age at which the first symptoms of stricture appeared, which ranged from 17 to 80 years and averaged thirty-eight years after the primary lesion. In eighteen patients it was possible to determine the interval between the first attack of gonorrhoea and the onset of disturbances of micturition. In three patients the interval was a few months, but in the majority it was much longer, being as much as sixty years in one case. As regards symptoms, 25 per cent. had complete retention and 25 per cent. had more or less difficulty in micturition. In 40 per cent. the chief symptom was painful micturition. Pyuria was found in fifty-seven (81 per cent.), haematuria in twelve, periurethral abscesses in fourteen, and periurethral fistulae in twelve; 36 per cent. were treated by gradual dilatation, 37 per cent. by internal or external urethrotomy, and the rest by suprapubic cystotomy, resection of the stenosed part of the bulbous urethra, or plastic operations.

Clinical Memoranda

Spontaneous Pneumothorax as a Complication of Artificial Pneumothorax

(WITH SPECIAL PLATE)

Numerous cases of spontaneous pneumothorax as a complication of artificial pneumothorax have been reported in the literature, but I have not found reference to any such case with the interesting features of the one here described. It is relatively common for spontaneous pneumothorax to develop on the same side as that on which the artificial pneumothorax has been induced, but in this case spontaneous pneumothorax occurred on the contralateral side.

CASE REPORT

A man aged 40 was admitted to Stobhill Hospital in April, 1933, suffering from pulmonary tuberculosis. The lesion, although active, was confined entirely to the upper lobe of the right lung. The case being a suitable one for collapse therapy, an artificial pneumothorax was induced in July, 1933 (Plate, Fig. 1). After this the patient's general condition improved greatly and he put on weight. His sputum remained negative throughout. He was discharged in October, 1933, and attended a clinic for air replacement and supervision until 1937.

On September 8, 1937, the patient, while sitting in a tramcar, was suddenly seized with a feeling of tightness of the chest and shortness of breath. He suffered great discomfort, but was able to make his way to the pneumothorax clinic, where he was examined.

He was admitted to Stobhill Hospital immediately, and was radiographed (Fig. 2). This film showed complete fibrosis and collapse of the right lung (the one in which the pneumothorax had been induced in 1933); and on the left side, which in 1933 had shown no disease, a spontaneous pneumothorax was now present. Despite the apparent seriousness of his condition as revealed by the film, the patient appeared perfectly well, showing no evidence of dyspnoea or cyanosis so long as he did not exert himself. He remained thus for his first seven days in hospital, but on September 15 he became breathless, and five minutes later was semicomatose and livid. Oxygen administered by nasal catheter was of little help, and an injection of adrenaline had no effect in relieving his symptoms. It was surmised that the pressure of air in the pleural cavity had risen sufficiently to cause the left lung to collapse almost completely. A needle attached to a manometer was inserted through the chest wall, and the air in the pleural cavity was found to be under considerable pressure. 2,000 c.cm. of air was aspirated in order to bring about a negative pressure and so allow the lung to re-expand. The patient was treated for shock, and in fifteen minutes he was quite well again.

Four hours later the patient had a similar attack of breathlessness and again collapsed. Another 2,000 c.cm. of air was withdrawn, and again the patient recovered within a few minutes. It had now become obvious that the pneumothorax was of the valvular type, allowing air to pass into the pleural cavity but not allowing it to escape, and it was only to be expected that the attacks of breathlessness would come on every few hours, whenever the pressure in the pleural cavity rose high enough. An attempt was therefore made to re-expand the right lung, which had been collapsed since 1933, in order, if possible, to give the patient some reserve lung tissue on which to work until the hole in the pleural cavity had healed. As was to be expected, the discomfort caused after the withdrawing of 300 c.cm. of air was such that the attempt had to be abandoned.

The pressure in the pleural cavity again began to rise, and in order to avoid the possibility of another collapse a hypo-

dermic needle was inserted through the chest wall. This had the effect of keeping the air pressure in the pleural cavity at the same level as that of the atmospheric air.

The patient remained well until September 17, when the needle became blocked and he collapsed again. After this he had no further breathless attacks, and the hypodermic needle was removed. He has remained perfectly well since. A radiograph recently taken shows that the left lung has re-expanded completely, and, incidentally, that an effusion has developed on the right side.

COMMENTARY

In the case described the cause of the spontaneous pneumothorax is not quite clear. It may be one of two things. First, it may be tuberculous in origin, due to a spread of the disease to the presumably healthy lung. Of this there is no evidence on *x*-ray examination, but the lesion at present may be very small. Secondly, it is possible that compensatory emphysema has developed on the left side, and that as a result of rupture of a bulla spontaneous pneumothorax has occurred.

Whatever the aetiology of the condition the treatment is the same. It is seldom that a case of bilateral collapse of this type is met with, but when it does occur the case is an emergency and requires immediate treatment.

The first point is to relieve the intrathoracic pressure. This is easily done if a pneumothorax refill apparatus is at hand, by using it to withdraw air. At the same time a knowledge of the intrathoracic pressure is obtained from the manometer on the apparatus. If, however, the apparatus is not available an alternative is to insert a needle into the chest and allow the intrathoracic pressure to fall to the level of the atmospheric air. This method can be further improved by attaching a piece of rubber tubing to the needle and leading the other end to a basin of antiseptic solution. The end of the tube is below the fluid level, and therefore allows air to escape but none to flow back into the chest. Sometimes it is necessary to keep up a system of continuous extraction, and for this an excellent method has been suggested by Boland (1934), in which he uses a Sprengel's pump to overcome the difficulty.

The majority of these patients die, but with energetic treatment an occasional life can be saved.

G. LAING BROWN, M.B., Ch.B.,
Medical Officer, Stobhill Hospital, Glasgow.

REFERENCE

Boland, E. R. (1934). *Lancet*, **1**, 231.

Reinfection in Diphtheria

The case reported below is instructive for the following reasons: (1) It appears that it is possible for a patient admitted to a ward with diphtheria to become reinfected during convalescence with a different strain of *C. diphtheriae*. (2) The administration of diphtheria antitoxin in this case either retarded the development of the patient's own active immunity or, if active immunity had been developed, it was only selective for the intermediate strain and did not prevent a second infection of the gravis type. (3) It further raises the question whether patients suffering from diphtheria should be segregated according to their particular strains of infection.

CASE REPORT

In February, 1937, a child aged 3 was admitted to the City Infectious Diseases Hospital, Hull, with a history of sore throat, headache, and vomiting for three days. Both tonsils were covered with recent thin membrane, and there was slight adenitis and peri-adenitis of the associated cervical glands. The condition was classified clinically as severe faucial diphtheria, and 8,000 units of diphtheria antitoxin were given intramuscularly and 8,000 units intravenously. A throat swab taken on admission yielded a good growth of *C. diphtheriae*, which on isolation in pure culture proved to be of intermediate type.

The membrane completely disappeared and the adenitis subsided in three days. Proteinuria was present from the tenth to the seventeenth day of disease. During the first fortnight there was some toxic change in the myocardium as evidenced by the pronounced weakening of the first sound in the mitral area, which persisted with decreasing obviousness into the fifth week. The patient continued to make normal satisfactory progress, and on the thirty-ninth day was allowed to sit up in bed.

On the forty-fifth day, when beginning convalescence, the child's temperature suddenly rose to 101.5° F. and the pulse rate to 136. A patch of membrane was visible on the right tonsil, and 8,000 units of diphtheria antitoxin were given intramuscularly in desensitizing doses. The following day a small patch of membrane appeared on the left tonsil. A throat swab showed the infecting organism to be *C. diphtheriae* again, but this time of the gravis type. There was no further growth of the membrane, and in two days the throat was clean.

There were no subsequent complications and the patient was discharged on the seventy-fifth day.

I am grateful to Dr. H. Mason-Leete, medical superintendent, for his permission to publish this case.

PHILIP SCIENCE, M.D.,
Late Resident Medical Officer, City Infectious Diseases Hospital, Hull.

Sea-sickness as a Possible Aetiological Factor in Volvulus of the Small Intestine

This case is of interest because of the association of severe sea-sickness with the occurrence of the volvulus, and also because of the difficulties of diagnosis in such a condition.

CASE REPORT

The patient was a healthy Swiss girl, aged 18, who had had no previous ill-health. Thirty-six hours after a very rough Channel crossing, during which she was violently sea-sick, she complained several times of intermittent colicky pains across the upper abdomen; there was nausea but no vomiting. Her symptoms were relieved by fasting, but returned when she again took food.

On admission to hospital as a possible case of appendicitis, the patient was in some abdominal discomfort; her temperature was 98° F., the pulse 68, and respirations 20. The abdomen was tender in the right and left hypochondria. No abnormality was detected in the chest, and the urine was clear. An accurate diagnosis could not be made, so she was treated on expectant lines, and her symptoms were relieved by fluid diet and local applications. However, when the diet was increased the acute pain returned.

As the patient was in acute abdominal pain on the fourth day following her admission a laparotomy was decided upon, though the pulse and temperature were still normal. At operation a volvulus of the mesentery involving the first few feet of the jejunum was found and relieved. The affected gut was congested and distended. No exciting cause of any kind was observed. The patient made a good recovery, with no recurrence of symptoms.

I can find no reference in the literature to volvulus following sea-sickness, but I feel sure that in this case the latter was an aetiological factor.

E. K. MCLEAN, F.R.C.S.Ed.,
Resident Surgeon,
Southlands Hospital, Shoreham-by-Sea.

Reviews

PSYCHOLOGICAL ASPECTS OF DISEASE

The Emotional Factor in Visceral Disease. By H. G. McGregor, M.D., M.R.C.P. Foreword by R. D. Gillespie, M.D., F.R.C.P. (Pp. 198. 8s. 6d. net.) London: H. Milford, Oxford University Press. 1938.

Towards the end of his life William Harvey wrote to a young medical man that though his own days as an explorer were over, it was a pleasure to welcome him as a participator in that enterprise. In like spirit elder members of the profession should welcome Dr. H. G. McGregor's work on *The Emotional Factor in Visceral Disease*, for it is one of the most encouraging signs in post-war medicine that many of the younger generation should have so speedily acquired wisdom concerning the psychological aspects of disease. Doubtless this is in part due to their freedom from the handicap of a rigid materialistic training, but it is also due to their own open-minded questioning of all things.

The author quotes Mohr as saying, "There is no such thing as a purely psychic illness or a purely physical one, but only a living event taking place in a living body"; which might well serve as a text for his own book. At the outset he reminds us, as did Starling, that the physiologists take care to exclude as far as possible any complicating factors from interfering with their mechanistic and chemical experiments. For their own purposes this is of course justifiable, but it obviously prevents their results from being applicable to the explanation of all the phenomena of disease. The newer conception of the influence of emotions in producing symptoms is, as he says, "of particular value in unifying the phenomena of human life. . . . Psychology and introspection study life from within; physiology and pathology from without. Each is complementary to the other . . . each is indispensable to a complete picture." This helpful introduction is followed by a lucid statement of the physiology of the expression of the emotions, in which stress is laid on the fact that man meets the altered requirements of his present state of civilization not with new organs but with organs of the same type as both his savage fellows and the lower animals. The phenomena which accompany emotion are the same as those which accompany physical exertion in self-defence or escape. The patient cannot be expected to realize this, especially as the cause of the emotion has so often been banished from the conscious memory. Hence a fear born of the unknown.

These principles are then applied to a study of functional disorders of the digestive, respiratory, and cardiovascular systems, and we may remark in passing that the only omission we detected was any reference to over-breathing tetany, a condition which seems to be of increasing frequency in nervous women. Throughout great stress is laid on the importance of a full history. A distinguished Viennese physician once said to his students, "Don't believe what the patient tells you; it isn't true." Whereas the fact is that even if what the patient tells you is demonstrably untrue about the disease, it can tell you a great deal about the patient who has that disease.

As Dr. McGregor points out, the emotional episodes that precipitate illness fall into two groups: (1) present emotional conflicts in conscious life, and (2) deeply hidden unconscious conflicts and complexes. Whereas the second group may call for the services of a psychologist, the first and larger group can be handled adequately by any medical man who has the requisite sympathy and insight. For even in this group the sufferer has never associated his symptoms with his conflicts. Simply to explain how the former result from the latter is more than half the battle. Cases are quoted copiously in support of this thesis. The interactions between endocrines and emotional states are then discussed, leading to an admirable exposition of the autonomic nervous system in relation to the foregoing. A practical discussion on diagnosis and treatment brings to a close a book which all can study with profit, and which is invaluable to the beginner who is faced on entering practice with problems to which his ordinary textbooks of medicine provide no clue.

ANAESTHESIA AND ANALGESIA

Modern Anaesthetic Practice. Edited by Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D., F.R.C.P., and Alan Moncrieff, M.D., F.R.C.P. (Pp. 231; 6 figures. 10s. 6d. net.) London: Eyre and Spottiswoode. 1938.

Gas and Air Analgesia. By R. J. Minnitt, M.D., D.A. (Pp. 84; 12 figures. 3s.) London: Baillière, Tindall and Cox. 1938.

The object of *Modern Anaesthetic Practice* is to provide a practical manual suitable for the general practitioner in his everyday work. It consists of a series of articles by different authors, some of which have already appeared in the *Practitioner* and have been revised, while the remainder have been specially contributed for this volume. The editors have, with the aid of a masterly introduction from the pen of Dr. Blomfield, successfully overcome the lack of cohesion frequently observed in works of this nature, but evidence of multi-authorship can be detected, and it is disconcerting to find di-ethyl ether indexed apart from ether, and divinyl ether apart from vinesthene. Such great progress has been made in anaesthesia during the past decade, both in the introduction of new agents and in the development of advanced methods, that it is difficult for those not intimately concerned with the subject to keep abreast of modern technique. A book, therefore, which is written by experts, which surveys the whole field of modern anaesthesia, and which is essentially practical in its outlook is to be welcomed. Many modern anaesthetic procedures can only be learned by actual experience and are beyond the range of the general practitioner, but from this book the reader will obtain the maximum amount of information that it is possible to convey by print. In particular, the chapters on basal anaesthesia, spinal anaesthesia, and nitrous oxide contain a wealth of detail and much practical advice, while the chapter on endotracheal anaesthesia makes the insertion of an endotracheal tube seem ridiculously easy. There is a detailed account of the methods employed to secure anaesthesia and analgesia in midwifery, including also a description of the various types of apparatus employed for this purpose, and the chapters on anaesthesia in dentistry, local anaesthesia, and volatile anaesthetics contain much of value for those in general practice. The theoretical aspects of the subject are ably discussed and space is found for a consideration of the, unfortunately, little-appreciated risks of explosion in anaesthesia. Perhaps the most generally useful sections of the book, however, are those concerned with post-operative care and with anaesthesia in the child, both of which fall frequently within the domain of the family doctor, and may be a source of not inconsiderable anxiety. Many will turn for guidance to this book, which is well printed, produced, and arranged.

The profession is indebted to Dr. R. J. Minnitt for introducing and developing the nitrous-oxide–air technique

for securing obstetrical analgesia. In *Gas and Air Analgesia*, which is addressed primarily to midwives, he details the history of the method, describes the construction and use of the various forms of apparatus employed, and gives clear and concise directions for administration in both normal and abnormal cases. There are also chapters on the use of gas and air in minor surgery, and upon recent legislative developments. The appendices, which occupy nearly one-third of the book, contain research notes and the original communications on the subject. Not even the excellent illustrations can reverse the opinion that the historical details could advantageously have been condensed and the space thereby gained devoted to a fuller consideration of the practical aspects of the method.

A TEXTBOOK OF MEDICINE

The Fundamentals of Internal Medicine. By W. M. Yater, A.B., M.D., M.S. (Pp. 1,021; 255 illustrations. 35s.) New York and London: D. Appleton-Century Company. 1938.

This new work by the professor of medicine in the University of Georgetown aims at presenting "the minimal amount of knowledge of clinical medicine a medical student or general practitioner should have at his fingertips." But it should be at once added, to allay any anxiety that might possibly be aroused by the word "minimal," that the standard is not low. The student is advised to supplement, when he enters the wards, his knowledge by larger textbooks, systems, encyclopaedias, and monographs such as are recommended at the end of the twenty-one sections of this volume. Like other authors of textbooks Professor Yater has found it advisable to call in the help of colleagues for special departmental contributions, such as diseases of the nervous system, mental disorders, dermatology, ophthalmology, otology, and endocrinology. He has written ten of the most important sections, such as those on the cardiovascular, renal, haematological, respiratory, and digestive systems, metabolism, allergy, and diet. Further, he has collaborated with one of his eleven contributors in three other articles.

The text is clear, practical, and well arranged, and there are useful tables of classification; differential diagnosis receives special attention, and illustrations are supplied from wide sources and generously.

SURGICAL ANATOMY OF HEAD AND NECK

Surgical Anatomy of the Head and Neck. By John Finch Barnhill, M.D., F.A.C.S., LL.D. Introduction by Paul S. McKibben. (Pp. 921; 431 figures, with many in colour. 90s.) London: Baillière, Tindall and Cox.

This large, heavy, and rather unwieldy volume on the surgical anatomy of the head and neck justifies its dimensions by the size and clarity of the print, which make reading inviting. Most of the illustrations, however, are not artistic and many are crude. This is in part explained by the fact that the author is himself responsible for them, and they are of the blackboard kind made during a lecture. The author has practised as an oto-laryngologist for a long period of time while teaching the surgical anatomy of the subject, and this aspect of surgical anatomy is naturally uppermost. In commenting on haemorrhage from the superior longitudinal sinus he states that this is always troublesome, dangerous, and sometimes fatal, since it is impossible to ligate the sinus and it is difficult to pack it effectively; but surely the most effective way of dealing with a sinus haemorrhage is to apply a large muscle graft. American spelling frequently gives a strange appearance to well-known words; thus we read on page 423 that the optic nerves dicussate, but duramater spelt as one word is new to us. A literary flavour is given to the work by odd verses scattered throughout, particularly in relation to plates; some of this is the author's own composition, other is borrowed, such as the lines of Oliver Wendell Holmes which appear under a plate of the base of the brain (p. 420).

While there is much in this book that is valuable (it is interesting to read the author's account of the saccus endolymphaticus), there is much that might with advantage be omitted, such as the plates that depict resection operations for epithelioma of the lip. It is doubtful whether any surgeon to-day is performing the resection shown, which belongs to the mutilating type of surgery practised before radiotherapy was available. In connexion with the mastoid the spine of Henle is mentioned and a triangle, but we looked in vain for the name of Macewen or any reference to Charles Ballance: it almost seems like referring to Bill Adams alone in an account of the Battle of Waterloo. This is a work that pleases and annoys the reviewer: pleases because it contains much of a rather striking character, clearly enunciated and authoritative, and annoys because mixed with this there is much that appears shoddy, ill considered, and hurriedly assembled or merely redundant.

INTESTINAL DYSPEPSIA

Intoxications et Carences Alimentaires. By Maurice Loeper. (Pp. 259; 4 figures. 60 fr.) Paris: Masson et Cie. 1938.

The organic diseases of the stomach and intestine—that is, those with a defined pathological lesion as a basis—are less common in practice than the so-called functional diseases, in which there is an indefinite or variable cause or foundation. Professor Loeper and his colleagues, who have produced an interesting and suggestive book on these functional disturbances of digestion, have been led by their researches to discard the notion of alimentary dyspepsia. Cytodiagnosis of stomach contents and the use of the gastroscope have demonstrated that in most of these cases there is an attenuated gastritis, shown in the desquamation of epithelium, erosion, congestion, and oedema of the mucous membrane. Similar conditions in the intestine may produce disturbances of secretion and absorption of food during digestion. It has long been recognized that these troubles may be provoked by foods such as irritating condiments, rich and sharp sauces. In addition there may be in certain persons a congenital idiosyncrasy towards fats. But it is especially towards proteins that a susceptibility occurs, some foods carrying toxic bases already formed, some in which during the process of digestion histamine and tyramine may be formed. In about 80 per cent. of the cases the cause of toxicity is histamine, and as well as the local effects there are those which are commonly regarded as anaphylaxis, intolerance, allergy, or hypersensibility. The bacteria of the digestive tract also contribute; some may be of proved pathogenicity, such as the salmonella group; others, though saprophytes, may produce toxins by acting on the food residues. At other times the bacteria may break through the intestinal barrier to become generalized or to infect the urinary tract during excretion. Thus general symptoms may arise, those of intestinal hypersensitivity, from affection of the blood, the vascular and nervous systems, and the skin. The digestive symptoms may not be severe; flatulence appears to be the most usual, and this is often increased by the simultaneous changes in the liver, which

diminish its detoxicating effect as well as slow the portal circulation.

Though most diets in ordinary life are adequate in food constituents and vitamin content, two factors may contribute to a state of chronic vitamin lack: the poor appetite of sufferers from intestinal dyspepsia and the insufficient absorption and storage, particularly of vitamin C, through accompanying disease of the liver. In these states, too, there appears to be an alteration of the metabolism of calcium and sodium. These various problems are dealt with in an illuminating way, and the diagnosis is attempted not only between these dyspeptic states and organic digestive disease, but also between them and neurosis—a state of hyperaesthesia which may be grafted upon the dyspepsia. Professor Loeper trusts an intradermal reaction with well-diluted (twenty times) milk rather than very dilute (1:100,000) solutions of histamine in the specific diagnosis. In treatment simplicity of diet is essential, correction of deficiency or excess of digestive juices, absorbents, and the use of injections of diluted milk intradermally for desensitization.

Notes on Books

Education for Marriage, by Mrs. ESTELLE COLE (Duckworth and Co., 3s. 6d.) comprises six chapters founded on talks given to classes of girls of varied type with the hope of dispelling that ignorance which is at the bottom of much marital disharmony. The first, on the parents' part in the training of children in sex matters, is perhaps the best. Rather an alarming amount of pathology creeps into the later chapters, though they contain much good sense and advice, especially in that on the honeymoon. That on the climacteric, male and female, looks very far ahead. Dr. Cole is more of a psychologist than a clinician. The section on birth control is erroneous and not up to date. Not everyone would agree that an engaged couple, if "ignorant of the vital facts of life, should seek information, not from the family doctor, but from a medical psychologist"; that coitus interruptus should be avoided "at all costs"; that impotence is "very common"; nor that "floodings" at the menopause "necessitate prolonged rest in bed." The book would be useful as specimen talks to teachers who wish to share in the good work of dispelling dangerous ignorance rather than for perusal by young people themselves.

A new edition has now appeared from the Oxford University Press (12s. 6d.) of *Oxygen and Carbon Dioxide Therapy*, by Drs. ARGYLL CAMPBELL and E. P. POULTON, which was very favourably reviewed in these columns on its first appearance four years ago. An addendum dealing with the oxygen tent and nasal catheter is now incorporated in the volume; most of this appeared as an article by Drs. Poulton and T. W. Adams in the *British Medical Journal* of March 21, 1936. We agree with Sir Leonard Hill when he says in the foreword that "the authors of this book have rendered valuable service in putting together in concise form a mass of information scattered in scientific literature, and combining this abstract with the results of their own extensive research and clinical observation, thus making the whole subject of oxygen therapy available to the medical practitioner."

On the Danger List, by Dr. SÁNDOR PUDER (Constable and Co., 7s. 6d.) is an account by a doctor of his experiences in undergoing three operations. He was singularly unfortunate in suffering twice from a perforated appendix and in having to submit to a third operation for removal of the appendix and repair of a scar hernia. He was given ether for his first operation and developed post-anaesthetic pneumonia which very nearly killed him. His second operation was done under local infiltration anaesthesia, and he is by no means enthusiastic about this from the patient's point of view. His third operation was done under spinal anaesthesia, and he seems to have been unfortunate here, too, in the degree and persistence of headache and the other discomforts from which he suffered afterwards, though he preferred this to either of his previous anaesthetics. Being by nature introspective, he has written an account of his illness and operations as seen from the patient's point of view, which should be read by every doctor. A foreword has been written by "Anthony Weymouth." We do not share his confidence in the effect this book would produce on the layman. We fear that it would frighten the average patient, man or woman, so badly that he would probably refuse to submit to any operation, even of the most urgent description. But by way of reassurance, we may say that the author was unfortunate in his premedication; more attention is paid to it in this country.

Under the title *Dental Disease: Its Chemical Causation and Cure* R. G. TORRENS puts forward his views on the aetiology and treatment of dental disease, and not only of dental disease but of most of the diseases to which the body is heir—including the common cold. "All disease results from a deficiency or condensation of electrical energy," and "health depends on a freely available interchange of atomic energy in the body"; the "electrionic" state of the blood is to be determined (the author considers the *p*H of the saliva mirrors the state of the blood and estimates this by a colour test) and the patient treated accordingly. Much is promised if the author's methods be followed—for example, "by estimating the electrionic upsets, and correcting these as a pre-operative measure, dentistry and medicine would banish difficulties in anaesthetic cases and render after-pain and surgical shock a thing of the past." For our part we are unable to follow the author either in his electrochemical introduction—which we think might with advantage be greatly shortened—or in his clinical descriptions. If, as the author seems to hope, a new era in medicine is opening, it needs a clearer exposition. The book is published by Henry Kimpton at 10s. 6d.

Mis-mated: The Principles of Incompatibility of Temperaments in Marriage and Family Life, by JOHN F. PETERS, is published by John Bale Sons and Curnow at 7s. 6d. The author has convinced himself that a person's attitude to life is determined by his relationship with other children, usually brothers and sisters, but sometimes close neighbours during his infancy—that is to say, that extroversion and introversion are conditioned responses. He further maintains that these varied conditionings determine compatibilities and incompatibilities in adult life, and that the study of the data presented in this book, which are the result of many years' study and investigations of a large number of both living persons and historical personages, would be of value in guiding those about to marry. How far the theories here set out will convince the reader may perhaps be determined by his own infantile conditioning. Whether the process of marrying and giving in marriage will be much influenced by this book we take leave to doubt.

Dr. G. E. BEAUMONT has produced a booklet, *Diets for Diabetes Arranged in Menu Form* (J. and A. Churchill, 2s.), containing sample diabetic diets used at the Middlesex Hospital. The examples are mostly of very low carbohydrate, high fat diets, and the diet tables old-fashioned in their arrangement. Surely to state that a certain meal contains exactly carbohydrate 6.6 grammes, protein 22.5 grammes, and 22.05 grammes of fat is too elaborate and hard to believe.

A copy of the Collected Papers from the Middlesex Hospital Medical School published during 1937–8 has been received from the Cancer and General Research Committee of the hospital, and can be consulted in the Library of the British Medical Association.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY DECEMBER 17 1938

THE NEXT "BRITISH PHARMACOPOEIA"

Preparations are going forward actively for the publication of the next edition of the *British Pharmacopoeia*, which is due in 1941. It will be the seventh of the series. The first was published in 1864, the second in 1867; then came a long interval before the third was published in 1885. The fourth issue appeared in 1898, the fifth in 1914, and the current one dates from 1932. The *British Pharmacopoeia* can never be entirely abreast of current practice. Probably many users of the volume, seeing it for the first time, are surprised at its comparative slightness, and at the absence of many commonly prescribed preparations. As it is properly regarded as the official authority on drugs, the question always arises whether the absence of a monograph on a particular preparation is to be interpreted as a criticism of the trustworthiness of that preparation. Those responsible for the *British Pharmacopoeia* could never, of course, include preparations solely on the ground that they are widely used; that would be a dereliction of scientific duty. But they have been impressed by the representations made to them that it is desirable to include as many commonly prescribed preparations as possible. With the more frequent revisions now obtaining there is a better chance of avoiding the obsolete on the one hand and the unverified on the other, and of making the volume more nearly reflect current practice.

The reappointed Pharmacopoeia Commission, which took office in October, with Dr. A. P. Beddard again as its chairman, has given consideration to a list of new drugs of proved therapeutic activity. Among the drugs for which it is hoped to provide standards are a number of synthetic chemicals which have received general approval in medical practice and the manufacture of which is free from control by patents. Among these are mandelic acid, sulphanilamide, theophylline with ethylene diamine, benzedrine, and urethane. In the group of serological and bacteriological products additional antitoxins and vaccines will be included. Certain members of the group of hormones, including protamine insulin with zinc and some of the sex hormones, have been chosen for description. When the last edition was published in 1932 certain international standards were available, but research work on hormones was then in progress which promised compounds of greater therapeutic activity, and so the Pharmacopoeia Commission at that time decided to await developments. These promises have now been fulfilled, and it is thought that the science of endocrinology has advanced enough to justify the grant of authoritative recognition to a number of products in the hormone series. Since the last *Pharmacopoeia* a great deal of research has also taken place in vitamin therapy, and this will be reflected in monographs relating to that subject. Vitamin B_1 has recently been isolated as a crystalline substance for which an international standard of potency has been adopted, and this will appear in the new volume. In pursuit of its policy of including preparations frequently prescribed if these are of established value the Commission proposes to bring in a larger number of such preparations as emulsions, liniments, nebulae, ointments, suppositories, pills, and compressed tablets. The opinion has grown amongst manufacturers and retailers that commonly used tablets, simple or combined, should be of standard weight, form, and composition, and a number of assay processes for tablets are under consideration by a committee. The Swiss and other European *Pharmacopoeias* already give such preparations official recognition, and the French *Pharmacopoeia* contains a general monograph which describes how the tablets are to be made and prescribes certain tests. It is expected also that steps will be taken to provide methods for the determination of many simple galenicals.

Several committees, each with a member of the Commission as its chairman, have been appointed to deal with specific subjects; over 550 monographs have been completed, and views have been exchanged on a lengthy list of suggested additions, deletions, and other amendments. The Commission works in close collaboration with the United States Pharmacopoeia Committee of Revision and with the similar bodies in Continental countries, and all the proposed alterations are submitted to the appropriate authorities in India and in the Dominions and Colonies. In the work of selection valuable help has been rendered by the Medical Research Council, the Science Committee of the British Medical Association, the Pharmaceutical Society of Great Britain, and other medical and pharmaceutical societies at home and overseas. In addition to the researches undertaken in the Pharmacopoeia Laboratory, a large amount of voluntary experimental work by experts in the various branches of pharmacy and pharmacology has been carried out to ensure that the descriptions

and standards shall be accurate and in accord with advances in practice. The Commission makes grateful acknowledgment of all this co-operation as it proceeds towards the conclusion of its task.

IMMUNIZATION AGAINST TETANUS AND DIPHTHERIA

The method of prophylactic immunization with formol toxoid which has given such invaluable aid in the control of diphtheria is now being used for the prevention of tetanus in man. No one would, of course, question the great service which tetanus antitoxin has given and will continue to give in the prophylaxis of tetanus, but this method is not without certain drawbacks. The immunity conferred is transitory, particularly so in those who have received serum before, and in the case of wounds which are slow in healing tetanus may eventually supervene unless the injection of serum is repeated. Again, tetanus spores may lie dormant in the tissues long after the wound has healed and may subsequently germinate with the production of tetanus. Active immunization with formolized tetanus toxoid should, in theory, overcome these particular shortcomings; whether it will do so in practice we should not be long in finding out, since this method of tetanus prophylaxis is now in use in the French Army and has recently been made available for our own soldiers. Even should this procedure do all that is expected of it—and the work of Ramon and his associates in France and of Major Boyd in this country would seem to show that it will—it is obvious that the application will be limited to those individuals, such as soldiers, whose risk of contracting tetanus is of a high order. One gathers, however, from investigations during the last few years by Ramon and his colleagues in France that those who have not previously been actively immunized can still enjoy the advantages of this method in the event of their being exposed to the risk of tetanus. The procedure proposed for them is a combined passive and active immunization: what Ramon terms sero-vaccination. The method consists in the simultaneous injection of a single large dose of antitoxin and 1 c.cm. of formol toxoid, the injections being made at different sites, followed by a second injection of 2 c.cm. of toxoid on the fifteenth day and a further injection of 2 c.cm. three weeks later. One might have expected that the antibody injected would interfere with the production of active immunity, but experiments on animals[1] and on man[2] would seem to show that this is not so. And in a recent paper by Ramon, Kourilsky, Richou, and Mme. Kourilsky[3] the results of titration of antitoxin in the blood of a number of individuals submitted to a somewhat similar but more intensive course of immunization leave no doubt that active immunization can be carried out under cover of a passive immunity. The procedure is said to be unaccompanied by any serious reactions, and Sacquépée and Jude[4] report having used it in the French Army with eminently satisfactory results. It also appears that a similar method is available for immunization against diphtheria, and that such a procedure is being used in France to immunize children living in a heavily contaminated environment.

The latest application of this knowledge is to employ sero-vaccination as a therapeutic measure in tetanus and diphtheria. It is difficult to understand what possible advantage combined passive and active immunization could have over serum therapy in tetanus, unless it were that, should the patient recover, he would be the possessor of an active immunity against this disease, and so not require a prophylactic injection of serum when exposed to the risk of tetanus on a subsequent occasion. In the case of diphtheria it is argued that a fair percentage of individuals are left with no immunity as the result of an attack of this disease and that the employment of serum-toxoid therapy would obviate this. It is further suggested that the occurrence of paralysis is possibly due to the fact that the immunity conferred by the injection of antitoxin at the beginning of the disease passes off rapidly, and that injections of toxoid would ensure the appearance of actively produced antitoxin just when that introduced passively was falling below an effective concentration. The course of injections advocated by Ramon[5] consists of 0.1 c.cm. toxoid followed twenty minutes later by 1,000 to 2,000 units of antitoxin per kilo of body weight; subsequently 1 c.cm., 2 c.cm., and 3 c.cm. of toxoid are injected at five-day intervals. It is stated that the reactions produced are not severe and do not increase in severity as immunization proceeds; in fact, if anything, the later doses of toxoid gave rise to less reaction than the earlier ones. Debré and Mallet[6] treated fifteen children by this method; they were all mild cases and ran an uncomplicated course. Sohier and Jaulmes[7] report observations on seven cases, only three of which, however, need be considered, since the other four were acute carriers, were Schick-negative, and also had an associated slight sore throat. These three patients recovered; one

[1] *C. r. Soc. Biol.*, Paris, 1925, **98**, 582.
[2] *Ann. Inst. Pasteur*, 1927, **41**, 803.
[3] *Bull. Mém. Soc. méd. Hôp. Paris*, 1938, **54**, 1287.
[4] *C. r. Soc. Biol.*, Paris, 1937, **125**, 711.
[5] *Bull. Mém. Soc. méd. Hôp. Paris*, 1938, **54**, 1301.
[6] Ibid., 1308.
[7] Ibid., 1378.

developed slight paralysis of the palate. Darré and Lafaille[8] treated thirty-three cases, four of which were classified as malignant, seven severe, and twenty of moderate severity; there was one case of laryngeal diphtheria and one with diphtheritic paralysis occurring one month after the onset of an attack of diphtheria. All these patients recovered. The twenty-three cases with moderate or severe attacks were uncomplicated by paralysis, while the four malignant cases, though developing paralysis of the palate, had no general paralysis or cardiac irregularity. All these authors were impressed by the absence of severe reactions to the toxoid injections, and in each group of patients investigated antitoxin titrations made on the patients' sera showed that an active immunity of varying degree had resulted from the injections of toxoid. Since so few cases have as yet been treated by this method it is impossible to pronounce on its merits or demerits.

THE ANGLO-EGYPTIAN SUDAN

The Anglo-Egyptian Sudan, being a condominium, is subject to the supervision and control of the Foreign Office, but in practice has been allowed great freedom in the development of its various services. The report of the Medical Department for 1937 is, as usual, the first of the oversea reports to reach this country. It is of especial interest as it gives an account of the growth, since the early years of this century, of the Sudan Medical Service. The Sudan lies between latitude 4° N. and 22° N. and covers an area of approximately one million square miles—arid desert in the north and tropical forest in the south. The population, which numbered under two millions in 1899, is now estimated at rather more than five and three-quarter millions. Administration is complicated by the fact that about one hundred languages and dialects are spoken in the country. The Nile and its tributaries are still the main thoroughfares, though some two thousand miles of railroad track have been built in the north and dry-season roads serve most parts of the south. The foundations of the medical service were laid by the R.A.M.C. in the days of military occupation, but since 1904 a civil medical service has been available. An excellent system of hospitals now serves all the populous areas, and dispensaries with native attendants in charge have brought European medicine within reasonable reach of practically all the people. The Medical Department early realized that the greatest contribution it could make to the welfare of the country was to train local medical and sanitary personnel, and the efforts that have been made in this direction are beyond praise. There are only forty-five British medical officers in the Sudan Medical Service, but so well have they done their work that malaria, relapsing fever, sleeping sickness, cerebrospinal fever, and small-pox have been kept under control: in 1937 no fewer than 561,196 persons were vaccinated against small-pox. Probably the greatest achievement of the Service has been the prevention of bilharziasis and of serious outbreaks of acute malaria in the irrigated area of the Gezira, an area which is of vital economic importance to the Sudan and in which conditions are most favourable for the spread of epidemic disease. In Khartum a small group of specialist officers have set themselves a high standard of professional attainment, to which the Kitchener School of Medicine and the graphic Museum of Hygiene bear ample testimony. The staff of the Stack Medical Research Laboratories, besides carrying out a large number of routine examinations and undertaking a great deal of teaching, have found time to make a number of special investigations into typhus fever, Weil's disease, and relapsing fever. One of the reasons for the rapid development of medical and sanitary work in the Sudan during the last twenty years is that the thirty-three British medical inspectors in the Service are really inspectors. They leave as much as possible of the hospital work to the Sudanese medical officers and spend a large part of their time in inspection and educational work in their districts. Another reason is undoubtedly the short tour of service. The general rule is nine months' duty, three months' leave. Anyone who is still unconvinced of the folly of expecting first-class service from Europeans doing tours of two and a half to three years in the Tropics should visit the Sudan. There is no other part of our tropical Empire where the staff are so much "on their toes."

ACUTE NEPHRITIS AND THE STREPTOCOCCUS

The very close relation between acute nephritis and infection by the haemolytic streptococcus is well known, and most cases of acute nephritis occur from one to three weeks after tonsillitis, otitis media, mastoiditis, or some other infection of the upper respiratory tract. Recently an attempt has been made to show more clearly the role of the streptococcus in these cases.[1] J. D. Lyttle and his co-workers have used two standards: bacteriological examination, and estimation of the antistreptolysin titre. Antistreptolysin is the factor that inhibits the haemolytic activity of the streptococcus in culture. It is found that patients who have not had a recent infection by the haemolytic streptococcus normally show less than 100 units of antistreptolysin in their blood. After an infection the titre rises to over 125, and in many cases to figures of 1,000 or more. Most of the 116 consecutive unselected patients with glomerulo-nephritis examined gave a recent history of infection of the upper respiratory tract. In 71.5 per cent. there was bacteriological evidence of infection with the haemolytic streptococcus, but as many were not examined until a week or more after the initial infection this figure is probably on the low side: in 94 per cent. there was an antistreptolysin titre of over 125. This seems to prove beyond doubt the importance of the haemolytic streptococcus in the causation of acute nephritis. An attempt was also made to correlate the amount of antistreptolysin present with

[8] *Bull. Mém. Soc. méd. Hôp. Paris*, 1938, **54**, 1405.

[1] *J. clin. Invest.*, 1938, **17**, 631.

the severity or duration of the nephritis. The result, however, was indefinite, as the antistreptolysin appears to vary with the severity of the initial infection and not with the severity of the nephritis, and it is a known clinical fact that cases with a severe initial infection are not necessarily the worst from the renal point of view. It may be of some significance, however, that five out of the eight cases which developed chronic nephritis had low maximum antistreptolysin values. The same authors[2] have also investigated by clinical and immunological studies the question whether nephritis that has once healed is liable to recur. Among a large number of cases followed up ten patients were found who, after recovery from acute nephritis due to streptococcal infection, subsequently had a further infection with the haemolytic streptococcus. Eight of the ten had no further attack of nephritis, but two developed acute haematuria during the second infection. In none of these cases did the condition become chronic. Only one of the ten patients had oedema at any time; none had hypertension. Most of them would therefore seem to have been of the focal type, though these authors do not appear to distinguish between focal and diffuse varieties of acute nephritis. It is encouraging to learn that patients with healed nephritis may undergo subsequent infections with little risk to the kidney. Nevertheless recurrent attacks of haematuria, each associated with an attack of tonsillitis, are not uncommon.

TESTING CANCER "CURES" IN THE LABORATORY

The evaluation of alleged "cures" for cancer by laboratory methods is a difficult and depressing task. Dr. Anna Goldfeder[1] has tested three supposed anti-cancer preparations—namely, Schmidt's vaccine, "ensol," and Jacob's hormone extract. Schmidt's vaccine is prepared from killed cultures of a protozoan-like organism which, according to the originator, can be isolated from all malignant tumours and cultivated in artificial media; Connell's preparation "ensol" has been commented on widely; the method of preparing Jacob's extract is a secret. These preparations were applied to tissue cultures of human tumours; they had no destructive action. They were injected into mice bearing transplanted tumours and did not prevent growth. Finally they were tested on human patients with cancer, but no inhibitory effect on the tumours was observed: a detailed report of these tests is deferred. Dr. Goldfeder concludes that the three products "cannot be considered as anti-cancer preparations," and few will disagree with her. Still, it is opportune to examine more closely the methods of test, for cancer "cures" are bound to crop up from time to time and a heavy responsibility rests on those who condemn or condone their use on human patients. The tissue-culture method registers a direct action of the agent under test upon tumour cells but has limitations. Tumour cells growing under artificial conditions are not necessarily as vulnerable as those growing in the body, and, although there are many ways of killing tumour cells *in vitro*, it is of no avail to destroy them by something which destroys the normal cells of the body at the same time. In the tissue-culture method it is difficult to arrange the essential control tests with normal tissues to demonstrate that an action upon tumour cells is specific and selective. Destruction of tumour cells *in vitro* is not, therefore, proof of therapeutic usefulness. The failure to kill tumour cells under the same conditions is no more proof of therapeutic inactivity. It may well be that malignant tumours are more vulnerable to indirect than to direct attack, and tissue cultures cannot register an action which depends on the stimulation of tissue or humoral processes within the body. Transplanted tumours of animals are essentially cultures of tumour cells growing in foreign hosts. An agent with a direct and specific action on tumour cells should destroy transplanted tumours without harming the hosts, but the process of transplantation results in new relationships between tumour and host, so that transplanted tumours regress under the action of agents which do not affect spontaneous tumours directly or otherwise. Tests on tissue cultures and transplanted tumours may yield strong presumptive evidence, but they are not conclusive. Tests on spontaneous tumours of animals are hampered by the difficulty of accumulating enough tumours to yield results which withstand statistical analysis. The difficulty is overcome in part by using inbred strains of mice in which cancer develops with high and regular frequency or by using, instead of spontaneous tumours, tumours produced experimentally by carcinogenic agents. The final test of a "cure" is its effect on human cancer. The laboratory investigator, combining the methods which are available to him, can form an opinion whether this test is likely to be safe and profitable.

[2] *J. clin. Invest.*, 1938, **17**, 623.
[3] *Amer. J. Cancer*, 1938, **33**, 560.

CARDIAZOL FOR SCHIZOPHRENIA

Although cardiazol was used later in the shock treatment of schizophrenia than insulin, it is so much easier to administer that it is rapidly becoming the more popular of the two. Facilities for the latter method require special administrative organization and a specially trained staff; for the former all that is necessary is a supply of the drug and an enthusiastic physician. According to Dr. Isabel Wilson,[1] whose monograph is noticed at p. 1272, Dussik and Sakel claim full remission with insulin treatment in 70 to 75 per cent. of early cases; and Meduna with cardiazol in 75 per cent. Küppers,[2] giving the results from forty-five German hospitals and clinics, states that insulin treatment produced 39 per cent. of recoveries in cases of less than a year's duration, and cardiazol 53 per cent. In both series about one-fifth of the patients failed to improve at all. The methods of selecting the cases are still insufficiently standardized for a reliable comparison of the two treatments to be made. There are difficulties and dangers with both. Those of insulin are usually

[1] *Report on Cardiazol Treatment and on the Present Application of Hypoglycaemic Shock Treatment to Schizophrenia.* By W. Rees Thomas and Isabel G. H. Wilson. H.M. Stationery Office, London, 1938.
[2] Quoted W. Enke. *Fortschr. Neurol.*, 1938, **10**, 404.

of acute onset and appear as an emergency during the actual treatment. Once countered they leave no permanent effect behind, though while they last there is a serious risk of death. Such emergencies may arise also in the course of cardiazol treatment. Dick and McAdam[3] have reported four cases of auricular fibrillation or acute heart-block occurring shortly after the injection and persisting for a period ranging from hours to days. With cardiazol, however, more lasting damage may be done. The frequency of fractures produced in the cardiazol fit is well known to those engaged in this method of therapy. Dislocation of the shoulder and jaw is so common that it hardly causes comment. Dr. Pameijer,[4] from the statistics of Dutch university clinics, stated that in 1,200 cases treated with cardiazol there were fifteen cases of fracture, most usually of the femur, and not infrequently bilateral. He also records seven cases of pulmonary abscess and "many cases of cardiac complications with two deaths." In all, there were four deaths in the 1,200 cardiazol cases as compared with six deaths in 700 insulin cases. So far as the mortality rate in treatment is concerned, cardiazol compares favourably with insulin. With cardiazol therapy there is, however, another risk to be faced which does not appear to be a matter of moment when insulin is used, and that is the risk of secondary dementia. Plattner[5] has reported seven cases in which there was failure of memory after combined treatment with insulin and cardiazol, and attributes the dementia to the fits set up by the latter. Insulin alone did not produce this syndrome, except in one case in which there had been a series of epileptic fits. Cardiazol is now being given not only for schizophrenia but for other psychiatric syndromes. It has been employed with success, for instance, in depressive states, and particularly in the somewhat chronic melancholic psychoses of the involutional period has given the impression of rapidly cutting short the illness. Recovery from these states, however, takes place to a large extent without any specific therapy, and it is possible that the advantages of cutting short the illness may be outweighed by the production of some permanent mental impairment. Further investigation of this serious risk is urgently required.

WHAT ARE EXAMINATIONS FOR?

Reprinted, with a small amount of additional matter, from the *Year Book of Education*, under the title of "The Purposes of Examinations,"[6] is a symposium with contributions by twenty-two university professors, readers, lecturers, and inspectors, with an introductory article or survey by Sir Philip Hartog, Director of the International Institute Examinations Enquiry. It is of great interest, and should be of real practical value not only to examiners but to teachers of all grades, to students, and to others concerned with education. The three chapters of most interest to members of medical faculties, colleges, and schools are the introductory survey, and those dealing with the M.B., Ch.B. degrees of the University of Edinburgh by Professor T. J. Mackie, and the final examination for the M.B., B.S. degrees of the University of London by Professor F. R. Fraser; but many of the other chapters on specific examinations contain observations which have a definite relevance to the general subject or to tests of professional competence. It is obvious that examinations serve several purposes, and that even a single examination may properly serve more than one specific purpose; but it is of the utmost importance that those who conduct any examination should realize clearly the purpose or purposes which it should be made to serve. Sir Philip Hartog emphasizes their use as tests of utilizable skill as distinct from tests of mere knowledge or memory. Particularly is this the case with reference to those final technical examinations which admit to the exercise of a certain specific calling or profession. It is interesting to note the method of applying this test to the medically qualifying examinations both in Edinburgh and London, and, presumably, elsewhere. The minimum prescribed for a pass is 50 per cent., but the assignment of this percentage is not effected by a mere addition of marks; it is determined by the judgment of the examiners as to whether it would be safe to allow a particular candidate to practise his profession or not. The minimum standard for this purpose in the mind of the examiner is assessed at 50 per cent., and deviations above or below this level are marked accordingly. Even so, Professor Fraser points out that such an examination must be more than a test which determines the degree of utilizable skill. It should also show whether the candidate has sufficient knowledge and understanding to avoid actions that may have serious results. Among other purposes of examinations briefly noticed or discussed are the estimation of progress towards attainment, the testing of the efficiency of schools, of intelligence, and of "culture," and the placing of candidates in an order of merit or proficiency. Their imperfections for this last purpose are frankly acknowledged, except when the number of candidates is very small, or in the case of those candidates who are as a group the best or those who as a group are the worst amongst a large number. It is made clear, too, that where the exact purpose of an examination test is ill defined these imperfections will be the more marked and the less will the test be likely to yield consistent or reliable results. The effects—as distinct from the purposes—of examinations on the curriculum of schools and their good or bad influence on individual candidates are referred to; and it is interesting to note that, while Professor Fraser is not entirely satisfied with the London University examination, and even regards its standard as a qualifying examination as unnecessarily high, Professor Mackie says, with regard to the examinations of the University of Edinburgh, that "the general feeling among examiners is that they yield a satisfactory result in testing the candidates' fitness." In this connexion he refers to the article by Dr. W. G. Millar in the *British Medical Journal* of December 12, 1936, and correspondence in subsequent issues.

[3] *J. ment. Sci.*, 1938, **84**, 677.
[4] Ibid., 689.
[5] *Z. ges. Neurol. Psychiat.*, 1938, **162**, 728.
[6] *The Purposes of Examinations: A Symposium.* With an Introductory Survey by Sir Philip Hartog, K.B.E. London: Evans Brothers. 3s. 1938.

SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

MANIPULATION OF DIFFICULT JOINTS

BY

GEORGE PERKINS, *M.C.*, F.R.C.S.

The Shoulder

Sir Herbert Barker claims that recurrent dislocation of the shoulder is curable by manipulation. It is difficult to believe this. One can conceive that after a dislocation the movements of the shoulder might be restricted by adhesions, which would cause a sudden twinge of pain, and that this might be mistaken by the patient for a re-dislocation. Manipulation would in such circumstances cure. But if there is an undoubted re-dislocation, evidenced by reduction of the dislocation by a doctor, only operation will cure. It must be remembered that the recurrence of the dislocation takes place at irregular intervals, and the patient, after several re-dislocations within a short time, may appear to have a normal shoulder for several years, so that it is difficult to assess the value of treatment, whether operative or manipulative.

There is a common syndrome that may be referred to as the *painful shoulder*. The patient complains of pain over the deltoid muscle, and the pain may travel down the arm, simulating a neuritis, which indeed it is often called by both the patient and the doctor. The pain is sometimes continuous, sometimes only on use of the arm. Some of these painful shoulders are helped, some cured, and some made worse by manipulation. Examination of the range of movement determines the type of painful shoulder with which the doctor has to deal. Care should be exercised to exclude scapular movement when estimating the range present at the shoulder-joint. If there is little or no movement—a condition called frozen shoulder—manipulation will aggravate the pain and will not increase movement. When there is a painful arc of abduction from 60 to 120 degrees, and yet full range is possible—a condition called tendinitis—manipulation as a rule neither harms nor helps. If movements are restricted to the inner half of the normal range manipulation is beneficial. The manipulation is done under anaesthesia and repeated at intervals of several weeks, as many times as necessary, until full movement has been restored. Nitrous oxide often gives sufficient anaesthesia. At each manipulation noises like the tearing of calico can be noted. Too much should not be attempted at one sitting; otherwise the shoulder afterwards is too painful to allow the patient, by exercises, to keep free the movement gained at the manipulation. When the range ceases to improve, the time is ripe for a further manipulation. If only one movement is limited a single manipulation cures. The shoulder is forcibly moved in the direction that causes the pain.

The Elbow

Tennis elbow, referred to in the previous article, is the only condition (except dislocation) that is helped by manipulation of the elbow. After a fracture about the elbow in a child it may be months before the elbow-joint regains full movement. Attempts to hasten matters by forced movements, by either a doctor or a masseuse, never increase but often diminish the range. It is wise to warn the parents early on during treatment that the elbow may not regain full range for about a year and that attempts to force movement will be harmful.

Wrist and Carpus

There are a number of joints here, and movement is intricate. The area presents a fine opportunity for manipulative surgery. After a minor sprain or overuse of the wrist the patient complains of pain on using the hand. On casual examination no abnormality can be detected, although an experienced observer can usually localize a tender spot and find some movement that is painful. Two common examples may be quoted. In the first there is tenderness over the semilunar bone on the dorsum of the wrist, and extreme plantar flexion of the wrist is painful. In the second the tenderness is between the bases of the second and third metacarpals, and dorsiflexion of the second metacarpal at the carpo-metacarpal joint is painful. It is quite easy to overlook the physical signs in the second example: many doctors do not realize that this movement even exists. Forcing movements in the painful direction will cure both these types of painful wrist. These two examples illustrate the only difficulty of manipulative surgery—namely, that of discovering the painful movement.

The Fingers

The finger-joints are, or should be, notorious for the rapidity with which they become stiff if held immobile. Unfortunately, stiff fingers do not react well to manipulation, and are much more easily prevented than cured. A sprain of a finger is apt to be succeeded by a tender swollen joint which remains painful on movement for months. One should not be tempted to try manipulation: no good comes of it.

Hip-joint

Rider's strain was referred to in the previous article; and in the early stages of osteo-arthritis the movements of abduction and extension can often be restored by forcible stretching of the hip under complete anaesthesia. No other condition is benefited greatly by manipulation.

Knee-joint

There is a type of painful knee in the adult on which manipulation acts like a charm. The patient, a man or woman over 40, complains of pain after use and stiffness after rest. In bed the discomfort is accentuated. He may be conscious of having twisted or jarred the knee some time previous to the onset of his symptoms. The radiograph is normal or shows slight evidence of osteo-arthritis, but no more than in the other knee, which is free of pain. In spite of long-continued physiotherapy and local applications the knee gets no better. On examination there is a localized spot of tenderness over the joint line, far back, on the inner side; full flexion is restricted by pain; internal rotation of the tibia on the femur is painless, and external rotation causes severe pain, referred to the inner side of the knee. Extension is full but gives rise to a twinge of pain. There may be no other signs. The bone-setter, if consulted, says the cartilage is displaced and he puts it back by a manipulation. The grateful patient believes him, and well he might, for he is cured. If instead of resorting to a bone-setter the patient consults a surgeon he may be persuaded to undergo an operation for the removal of the cartilage. Again he is cured,

although the surgeon at the operation could demonstrate no tear or displacement of the cartilage. The bone-setter thinks he has replaced a cartilage; the surgeon thinks he has removed a normal cartilage. Yet both have cured their patient. What is the explanation? That both bone-setter and surgeon are wrong in their suppositions: the cartilage was not displaced, nor was it normal.

The semilunar cartilage intervenes between the tibia and femur; it allows the femur to roll and to rotate on its upper surface, while its lower surface is gliding backwards and forwards on the tibia. Excessive mobility of the semilunar cartilage on the tibia is checked by the attachment of the outer rim of the cartilage to the capsule of the joint, but the binding material is lax enough to allow the semilunar cartilage to glide freely on the upper surface of the tibia. If the trunk is twisted while the foot is in contact with the ground the femur may be forcibly rotated in on the tibia, and this rotation force will tear the binding material connecting the rim of the cartilage to the capsule—a condition we may term rotation sprain of the knee. When the torn connecting fibres have healed, the mobility of the semilunar cartilage may be impaired, and during normal movements the capsule is pulled upon, giving rise to pain. The condition is curable by stretching the scarred connecting fibres by moving the knee forcibly in every direction under anaesthesia. Surgical removal of the cartilage also cures the pain, but the less drastic treatment by manipulation is preferable. The majority of surgeons do not operate on a semilunar cartilage without evidence that the cartilage has been torn and displaced. Positive evidence is afforded by a history of locking of the joint succeeded by unlocking. If this evidence is not forthcoming it is wise to try first the effect of manipulation, and only to operate if manipulation fails to cure. In the young adult a torn cartilage is more frequent than a rotation sprain, and vice versa in patients over 40.

The Ankle

The injury that is commonly called a sprained ankle is truly a sprain of the subastragaloid joint caused by excessive inversion of the foot. It is unfortunately still the custom to treat sprains by rest, and as a consequence of this treatment many patients develop adhesions. The usual story is that ever since a sprain of the ankle some weeks or months previously the patient has had slight puffiness on the outer side of the ankle below the external malleolus, and gets pain after using the foot. Examination reveals tenderness above the front and tip of the external malleolus, and pain on inversion of the foot in plantar flexion; these two movements are also less in extent than on the uninjured side. Often the foot has been immobilized in plaster by the harassed doctor in his search for something with which to pacify the patient; pain, however, returns when the foot is used actively again after removal of the plaster. The condition can be cured by manipulation. Under anaesthesia (nitrous oxide is often sufficient) the foot is forcibly plantar-flexed and inverted in one movement. As soon as the patient recovers consciousness he is encouraged to exercise the foot in the direction that previously was painful. Skipping and hopping on tiptoe are excellent. A week's supervision by a masseuse completes the cure.

The Foot

Much misunderstanding about painful feet comes from the obsession—shared by patient and doctor—about the arches of the feet. The patient, believing that a fallen arch is the sole reason for pain in the foot, demands either from the doctor or from the instrument-maker a support to restore his arch; and often the doctor weakly accedes to the request. It would be so much better if we all thought in terms of joint movement instead of arches. When confronted with a patient who complains of painful feet our line of reasoning should be, I think, as follows: Is the cause of the pain purely mechanical, due to the stress of weight-bearing or of walking? If so, can we do anything to diminish the stress? If one movement is painful manipulation will often cure. If the patient, when standing or walking, is using the extreme range of movement of any joint and so putting tension on ligaments we can often increase the range of movement by manipulation.

Foot supports have only three useful functions. They can, by making the bearing surface of the shoe fit the under surface of the foot, increase the weight-bearing area; and they can take pressure off any portion of the foot that is tender. Lastly, they can restrict the movement of a joint to its painless arc; rather than do this, however, it is often better to attempt by manipulation to restore a painless range of movement.

The supreme importance of the toes in walking is not sufficiently appreciated. Many cases of metatarsalgia—thought by the patient to be caused by a dropped anterior arch—arise because the toes are clawed—that is, flexed at the interphalangeal and extended at the metatarso-phalangeal joints. These toes can often be straightened either gradually by the repeated manipulation of a masseuse, or rapidly by manipulation under anaesthesia.

The Neck

Pain referred to the suprascapular region and down the arm is frequently cured by a manipulation of the neck. Headache and earache may also be relieved if associated with painful movements of the neck. As with every other joint, an *x*-ray film should be taken before manipulation is decided upon; but osteo-arthritic lipping, particularly of the bodies of the fourth and fifth cervical vertebrae, is not a contraindication. Faradism and exercises should follow the manipulation.

Upper Part of Back

Many an obscure thoracic or abdominal pain disappears after manipulation of this region of the spine. Interthoracic and interabdominal lesions must first be eliminated.

Lower Part of Back

Sacro-iliac subluxation is a diagnosis often made to account for low backache. Whether the sacro-iliac joint ever does subluxate is doubtful; but there is no doubt that many patients labelled with this diagnosis are cured by manipulation. It seems probable that the clinical term "low backache" comprises several pathological entities. Unless there are definite contraindications manipulation should always be tried. It can do no harm, and even if it does no good it is of value in elucidating the diagnosis and as a guide to further treatment. The contraindications are: (1) *X*-ray evidence of bone disease; simple anomalies of structure are, however, of no importance. (2) Neuritis, evidenced by muscle wasting, nerve tenderness, and loss of ankle-jerk. (3) Total rigidity of the lumbar spine from spasm of the erector spinae muscles.

Causes of pain other than of skeletal origin should first be excluded before resorting to manipulation. Complete muscle relaxation is needed; intravenous pentothal gives this for certain, but evipan is often insufficient. The use of an anaesthetic of short duration and with no after-effects has the advantage that active exercises can be started early.

BRITISH RADIOLOGICAL CONGRESS

CONTACT X-RAY THERAPY

The twelfth annual radiological congress under the auspices of the British Institute of Radiology was held at the Central Hall, Westminster, from December 7 to 9. In addition to a number of papers dealing with the applications of *x* rays to the arts and sciences (including the art or science of crime detection), there were two medical sessions, one devoted to therapy and the other to diagnosis. One of the two memorial lectures in association with the congress also had a medical subject. Associated with the congress was an exhibition of *x*-ray apparatus, to which over twenty firms contributed. A prominent feature was the apparatus for low-voltage contact therapy, which was the subject of one of the discussions. The congress was under the general presidency of Mr. W. E. Schall, the president of the Institute, but Dr. Maitland Beath and Dr. L. A. Rowden presided over the medical sessions.

Professor J. M. WOODBURN MORISON, in opening the discussion on low-voltage contact therapy, said that this was supposed by some not to be a new method. The tube was very much like the Lenard tube used in 1894, and, thirty-five years ago radiologists were working with low voltages and getting results sometimes quite good. But no tube exactly like the tubes now to hand for Chaoul therapy had been available before to give radiation having a geometrical distribution in the tissues, imitating the distribution of the radium applicator and to some extent that of the radium "bomb." With this low-voltage contact or Chaoul therapy irradiation was so circumscribed that the healthy tissues around the lesion sustained no damage, for, after all, radiation was damaging, and all living tissue could be destroyed by it if it were applied in sufficient amount. It was, indeed, the special virtue of radium that with the gamma rays there was no selective action, but a purely geometrical distribution. By no means all cases were suitable for these methods. The field was limited at present, though as time went on it might be extended with the help of surgical intervention in the case of lesions less accessible. The real problem for the radiologist in the treatment of cancer was the accessibility or otherwise of the lesion. Surface lesions were accessible, and it was here—in cancer of the oral region, for example, or cancer of the cervix—that radium had been most successful.

Comparison of X-ray and Radium Treatment

The Chaoul apparatus, Professor Morison went on, could deliver anything from 100 to 200 *r* units a minute, whereas with radium the rate of irradiation was very much smaller (a later speaker said that 1 mg. of radium at 1 cm. gave 9 *r* an hour). Consequently with the former method a larger number of cases could be dealt with in a given time. It was not a question of two or three hours' treatment daily, but of two or three minutes' treatment, for many of these cases. So far as the reaction to low-voltage *x* rays was concerned, this was very similar to that with radium for an equivalent dosage of *r* units. There was no more flexible apparatus than the Chaoul tube; it could be easily handled, and the rate of irradiation and distance from the tissue readily adjusted. So precise an instrument was it that he felt it should be installed in every *x*-ray department where research work was done. It was quite easy to treat superficial lesions and get excellent results, and with surgery of access it would be possible to tackle such conditions as bronchial and oesophageal carcinoma, for which radium was extensively used. Some cases of cancer of the rectum had been treated by this method at the Royal Cancer Hospital.

Among the superficial conditions the treatment was specially effective in rodent ulcer, and in such a condition as rodent ulcer near the inner canthus an even distribution of the radiation was secured by a wax filling composition. In one case of rodent ulcer the actual dose given by the Chaoul method was 5,700 *r* spread over twelve days, equivalent to treatment for two or three minutes a day. The scar formed was soft, pliable, and painless. As a rule, 400 *r* was the daily dose. Cases of large epithelioma of the lip and elsewhere had been successfully treated. Metastases should be treated by high-voltage *x* rays of 200 or 400 kV, but the primary lesion was best dealt with by low-voltage contact therapy. He showed a table of statistics of cases treated from 1935 to 1938 with low-voltage short distance or contact therapy, using the Chaoul apparatus. The cases numbered 500 (312 malignant and 188 non-malignant), the malignant cases including 102 cases of epithelioma, also 100 of cancer of the breast. A high percentage of successful results was recorded in the different categories. Of the eighty-two cases of rodent ulcer treated, 97 per cent. were alive and well, with no sign of recurrence.

Radium was very much in the public eye at present, said Professor Morison, and people had got an impression that it was a cure for cancer. But only a very small proportion of cases were suitable for radium treatment, and nothing was done with radium which could not be equally well accomplished by suitable *x*-ray applications. The economics of the question deserved some study. Even if, for the sake of argument, the radium "bomb" were a cure for every type of cancer—which was not true—a "bomb" could treat, perhaps, 200 cases a year, and about 140,000 cases, apparently, required treatment. So far as his knowledge went there were 90 grammes of radium available in this country.

Technique of Contact Therapy

Dr. J. STRUTHERS FULTON, who showed a colour cinematograph film of the technique of contact therapy, said that while low-voltage *x* rays had been successful in treatment for the past thirty years, the present technique had become possible only as a result of the development of shock-proof equipment. The chief advantage over radium was in the high dosage rate—a dose of 300 *r* per minute at 3 cm. distance enabled a large number of patients to be treated with the one plant. The treatment might be fractioned to a daily exposure of one to three minutes, though in the case of malignant lesions limited in extent it could be given in one single massive dose lasting not more than fifteen minutes. The elimination of stray radiation presented no problem, and the *x*-ray beam was accurately confined to the area under treatment. At the kilovoltages employed the characteristic rays of lead were not emitted, and therefore that substance might be used directly on the skin to define with accuracy irregular areas of treatment. In the case of certain lesions in the mouth and throat, where the implantation of radium presented technical difficulties, *x* rays might be used successfully, and by using focus skin distances up to 20 cm. correspondingly large areas could be treated.

The apparatus the working of which he described was installed at the Western Infirmary, Glasgow. The film he projected was designed partly to show the flexibility of the tissues treated after healing had taken place. The cases demonstrated included epitheliomas of the lip and other parts of the face. It had also been possible to use the method for localized tumours of the bladder.

Dr. G. J. VAN DER PLAATS of Utrecht spoke on the same method for the treatment of superficial cancer. The advantages of the method were soft radiation, short distance, and fractionized dose, though, of course, this last could be applied to other methods also. The object was to get a sufficient dose, say 3,000 *r*, at the base of the tumour, not troubling about what the skin received, but ensuring that as little radiation as possible penetrated the underlying healthy tissues. His usual technique was to employ a 2 cm. focal skin distance and a filter of

0.2 mm. aluminium. The very short treatment time enabled him to dispense with tube or applicator stands; he simply held the tube in his hands, with the cable across his shoulder. He had treated more than 100 tumours by this method with excellent results.

Radiology in the Diagnosis of Urinary Infections

Sir GIRLING BALL, who addressed the congress on this subject, began by lamenting that so often general practitioners, instead of sending cases of chronic urinary infection for examination, treated them for a long time with various drugs. He spoke principally of infections in which *B. coli* and its group were concerned. The persistence or recurrence of an infection with this organism indicated some lesion of the tract which predisposed to the condition. So far as lesions of the lower urinary tract were concerned, cystoscopy was the first method of examination. Usually more information could be given by cystoscopy than by radiography, but there were two exceptions—namely, those cases in which the cystoscope could not be passed into the bladder, and those in which there was diverticulitis of the bladder. In the case of lesions of the upper urinary tract, the surgeon could not get on at all without the help of the radiologist. He had operated on over 300 cases of stone in the kidney, and in only one of them was there no shadow shown in the *x*-ray picture.

With the help of numerous radiographs Sir Girling Ball indicated various pitfalls. He showed one case which had been diagnosed as calculus. The patient had a very mild type of urinary infection; the organism found was the *Staphylococcus albus*. The supposed stone turned out to be a small localized tuberculous focus in the kidney, giving a calcified area. If an attempt had been made to remove what was thought to be a stone the real disease would have been left behind, and the patient's condition would have become worse. He also stressed the importance of having a pyelogram of both kidneys in congenital hydronephrosis and in other conditions, and, further, the need in all cases of doubt as to the findings with the intravenous pyelogram of combining a retrograde pyelogram with it. Intravenous pyelography was a simple method which could be employed in any patient, but there were errors which came about if retrograde pyelography were not employed.

Dr. L. A. ROWDEN regretted that the practice of screen examination in renal cases was so rarely employed. Careful examination on the screen would reveal features and correct errors which were beyond the capability of the negative. For example, on the screen a differential diagnosis between a stone and a gland could be easily made. Dr. DUNCAN WHITE said that before intravenous pyelography a blood urea test should be made. If there was no active renal tissue to excrete uroselectan it was obviously of little use proceeding. Dr. G. VILVANDRÉ also demonstrated some aspects of renal radiology, showing cases of unusual distribution of calculi and of congenital abnormalities, as, for example, the patient with three or four ureters. He agreed that retrograde pyelography was essential in quite a fair proportion of cases. *X*-ray examination, after all, was only one of the examinations which were needed in the diagnosis of urinary and vesical disease.

"Stereo-radio-stratigraphy"

Dr. C. CHAUSSÉ of Paris discussed the application of the various methods, of which tomography is the best-known example, of radiographic analysis. He had invented a special stereo-radiographic table with a centring device, in which the central ray from the tube passed through a fixed point, and he showed how this could be used for obtaining stereoscopic images and also, with some adjustment, for obtaining the successive planes used in tomography. He showed a number of planigraphic sections through the skull and through the auditory apparatus, and specially stressed the value of the method in otology. He also described for the second time in England (the first description having been given at the Section of Otology, Royal Society of Medicine, on November 4) an adaptation of the apparatus to the combined localization and extraction of radio-opaque bodies. This was done by means of what he called the luminous compass. The compass is made by two beams of light, one of them representing the central ray of the *x*-ray tube and the other so arranged as to be coincident with the first at the localization of the foreign body. The localizer is used on the actual operation table, and the surgeon in his dissection is guided by the beam. As the two luminous spots approach each other he knows that he is nearing the position of the foreign body, and when they meet, that his probe has actually reached it. The instrument, which embodies the principle of the theodolite, evoked much interest.

X-ray Diagnosis of Gastric Cancer

The twenty-first Silvanus Thompson memorial lecture was delivered by Dr. LEDOUX LEBARD of Paris, whose subject was "The *X*-ray Diagnosis of Gastric Cancer." Medical students were taught, he said, that gastric cancer was a disease of very short duration, and that continuous loss of appetite and weight were two cardinal symptoms; also that in the prolonged absence of pain the patient usually sought advice too late for operative surgery, and therefore early *x*-ray diagnosis was only now and then possible. These statements were not necessarily true. Gastric cancer showed great differences in duration. He recalled two cases, one of which was three years in evolving and the other nearly five. In regard to appetite and weight, he instanced one patient whose excellent appetite persisted until a week before radiographic examination revealed a hopeless condition. Malignancy of the ulcerous form was much more difficult to recognize than simple ulcer. Most of the characteristic *x*-ray features were only demonstrable on the film and not fluoroscopically. The development of these tumours was generally very slow. By a series of radiographs he indicated the changes of contour, more especially on the lesser curvature, which were pathologically significant. He stressed the ability of the *x*-ray picture to reveal quite small manifestations which were hardly detectable by any other method.

The other memorial lecture delivered in connexion with the congress was on the influence of *x* rays in pure and applied science, by Dr. G. SHEARER of the National Physical Laboratory. It is interesting in view of the collaboration of physics and medicine which the Institute represents that that lecture, in memory of a medical man, Sir James Mackenzie Davidson, should have been delivered by a physicist, and the other lecture, in memory of a physicist, Silvanus Thompson, should have been delivered by a medical man.

SHOCK TREATMENT OF SCHIZOPHRENIA

A report, prepared for the Board of Control by Dr. Isabel Wilson, on the new methods of treatment of schizophrenia has been issued.[1] It is a small and handy booklet that should be of considerable service to those engaged in these methods of treatment, and is of interest to psychiatrists in general. On the instructions of the Board of Control Drs. Rees Thomas and Wilson visited numerous treatment centres both on the Continent and in England, and

[1] *Report on Cardiazol Treatment and on the Present Application of Hypoglycaemic Shock Treatment in Schizophrenia.* By W. Rees Thomas, M.D., F.R.C.P., D.P.M., Medical Senior Commissioner of the Board of Control, and Isabel G. H. Wilson, M.D., M.R.C.P., D.P.M., Medical Commissioner of the Board of Control. London: H.M. Stationery Office. 1s.

Dr. Wilson, in addition, has reviewed the greater part of the now exceedingly extensive literature on the subject. The report provides a useful compendium of the method of treatment with cardiazol, with insulin, and with combinations of the two methods; the staffing and other administrative arrangements required; the dangers and complications and contraindications to treatment; theories of the mechanism of improvement; and the results obtained hitherto. The literature reviewed includes 152 references, and the bibliography is of great value to any student of the subject. It is an eminently practical volume, and might well be used as a working handbook by superintendents and others desiring to start one or other of these new methods.

Although the report suffers from lack of personal experience in treatment of either author, the technical methods and other data are taken from authoritative sources and should be reliable. A greater weakness is the lack of any critical attitude in the evaluation of the work of different authors, which shows itself particularly in the discussion of the theories of the mechanism of improvement, many of which are highly speculative and fanciful. As a result of their investigations Drs. Rees Thomas and Wilson are obviously of the opinion that the application of these methods of treatment should proceed. They cautiously state as their conclusion that "results are encouraging, but the well-known difficulties of statistical evaluation have not been solved."

Reports of Societies

ILLEGAL OPERATIONS

A dinner-discussion took place at the meeting of the West London Medico-Chirurgical Society on December 2 on the subject of "Illegal Operations." Dr. MAURICE SHAW, president of the society, was in the chair.

Mr. CECIL BINNEY, barrister-at-law, said that of all illegal operations that for abortion was the only one which, medically speaking, was specifically forbidden by law. It would be, however, substantially true to say that all operations were illegal unless they were rendered necessary for medical reasons. Sterilization, for example, unless it was carried out for the health of the person concerned—if it ever was—was clearly illegal. To say that there was not likely to be a prosecution was irrelevant. One could easily imagine prosecutions should anyone set out to perform such operations as a commercial venture. But while operations for sterilization were illegal because they came within the words of the Offences against the Person Act, 1861, operations for abortion were more specifically forbidden, probably because the interests of a second person—namely, the unborn child—had to be considered. To bring to an end something that had already begun was in a different category from preventing something from beginning. Thus contraception was different from taking active steps to terminate the life of a child once it had begun. Although the law permitted a doctor to induce miscarriage if it was considered necessary to save the woman's life, it was more rigorous in this sphere than in that of other operations in which the interests only of the individual were concerned, because in abortion it was a commencing life which was destroyed. But it might be, following the recent trial of Rex *v.* Bourne, that the law was altering.

Changes in Thought and Practice

Mr. ALECK BOURNE excused himself from saying anything about the recent trial, a subject of which he was heartily tired. The ideas on this subject at present were governed by three main conditions. There was first the ecclesiastical view; canon law had contributed considerably to civil law. Secondly, there was the effect which the widespread practice of abortion might have in a decline of population. Thirdly, there was the consideration of the physical dangers of the practice. Ancient Greek writers referred to a widespread practice of abortion, but made no mention of laws which prohibited it. In fact, Plato went so far as to advise abortion for all women who became pregnant after 40 and all whose husbands or paramours were over 45. In Roman times there were many references to the practice, but again none to penalties until, he thought, Cicero advocated punishment. But the idea of penalty was vague until the Christian era. The early Christians were a downtrodden people, amongst whom, as a relief from their present sufferings, the idea of the joys of the immortal life hereafter became paramount, and this led to emphasis on that moiety of man, the soul, which was destined to live after death. Thus it was easy to see how foeticide was held in particular abhorrence, because it meant the killing of that part of man which was endowed with the capacity for eternal enjoyment. As Christian ideals spread among Western peoples there went, together with the idea of the imperishability of the soul, the classification of an operation for abortion as a major crime. In the Middle Ages the laws against abortion were savage: the offence was punishable by death for both the woman and the abortionist. In the seventeenth and eighteenth centuries the subject entered upon a less barbarous phase, but he believed that nothing definite was codified until the Act of 1861.

To-day there was an increasing desire among women for this procedure. This was due partly to the decay of religious influence, partly to economic and domestic conditions, partly to the liberation of women from the shackles of reproductive life, and partly also to sheer lack of desire to produce children. Probably there was a greater prevalence of irregular sex relationships, and when these resulted in pregnancy there was a demand for its termination. Central Europe showed a different picture. There the desire was to have larger populations, partly for military purposes, partly to bring about population pressure and so justify aggressive policy.

The whole subject was one on which it was impossible to get hard-and-fast decisions, because it was governed by prejudice, ecclesiasticism, training, preconceived ideas. An imperative thing was to clean up the grossly illegal practice of abortion—practice by sharks who took from the pregnant woman not only her foetus but her purse. The practice of these people was utterly repulsive. But the law could not be left as it was. The law might well be widened so that the girl pregnant as the result of rape could be legally relieved of her pregnancy. Some method ought also to be devised whereby a doctor with one or perhaps two consultants, believing that the procedure would be for the ultimate benefit of the health of the prospective mother, might be allowed to perform it without the stigma which now inevitably attached to it. Actually it was very rarely necessary to induce abortion to save a patient's life. How many women were killed by the continuance of their pregnancy? But there were a very large number who were permanently incapacitated, whose health sank to a lower level, and who became less efficient as mothers to their previous family. He had no patience with canon law as applied to civil life. As the community were not all Christians ecclesiastical ideas should not be made civil law.

The Roman Catholic View

Dr. W. J. O'DONOVAN quoted from the summing-up of Mr. Justice Macnaghten in the Bourne case: "There are others [in the medical profession] who, for what are said to be religious reasons, object to the operation being performed at all in any circumstances." He drew attention to the scorn of the statement "are said to be." Surely that devastating comment need not have been made. The judge had gone on to say that in a case where the life of a woman could be saved by performing the operation, if

the doctor refused to perform it on the ground of some religious opinion and the woman died, "he would be in grave peril if he were brought before this court on a charge of manslaughter by negligence." This "menace" could be dismissed at once. If the patient were an informed Catholic woman no question would arise. If a Catholic doctor were in charge of a Protestant patient it was quite certain that he would explain such a matter to her responsible relations long before the crisis was reached, and it would be his duty, in justice to them, to indicate that it was customary among some members of the profession to carry out an operation to empty the womb in the attempt to save the mother's life. Whatever unconsidered enthusiasm this verdict might have evoked in the medical profession, they might be sure that the great body of silent and thoughtful people would feel that it left doctors with even less helpful guidance from the law and with less protection than they have formerly enjoyed. They would know that it conferred freedom on them, but added materially to the already heavy burden of their responsibility.

The rest of Dr. O'Donovan's remarks was a recapitulation of the fame and service of Catholic doctors in all ages. St. Luke was soaked in the tradition of Hippocrates, and the words of the Hippocratic oath were plain and without qualification: "I swear . . . nor will I aid a woman to procure abortion." "I do not envy a trial judge faced with a Christian doctor, Hippocrates, and St. Luke in the dock at the same time!"

The Principles of Eugenics

Dr. C. P. BLACKER reminded the meeting that the legal aspect of sterilization was discussed with great thoroughness by the Interdepartmental Committee between 1932 and 1934. The recommendations of that committee were influenced to a large extent by considerations arising from the problem of mental defect. There was no doubt as to the present illegality of this operation on the mental defective. With regard to those of sound mind he understood that the operation for voluntary sterilization was similar from a legal point of view to other operations of a non-therapeutic character, such as ritual circumcision, blood transfusion (in the case of the donor), and "face lifting." From the eugenic standpoint it was most desirable that any ambiguity in the law should be removed. The Offences against the Person Act, of course, was passed at a time when no one dreamed of such procedures; an operation for sterilization for eugenic purposes was performed for the first time in 1899, nearly forty years after that Act had been passed. Judged from the moral standpoint, there could be no doubt that an operation to terminate a pregnancy was more "shocking" than an operation to prevent pregnancy, for in the former case it was obvious that life which had already begun was being destroyed. On the other hand, judged from a biological point of view, there was little doubt that sterilization was the more drastic procedure, for the simple reason that to sterilize a person, the measure being to a large extent irreversible, was permanently to disqualify him for the function of reproduction. If they divested themselves of moral feelings towards these questions he thought it was clear that the sterilizing operation was from a biological point of view the more drastic. Hence it would be desirable to legalize, or rather to establish facilities for, the voluntary termination of pregnancy in such cases as would also be regarded as proper for sterilization, and it was in these respects that the question of illegal operations impinged upon the subject of eugenics.

Viscount DAWSON OF PENN said that it was true, as the opener of the discussion had remarked, that there must always be a lag between law and medicine, and rightly so, but the recent considerable change in public opinion had made the lag more manifest. He always thought it undesirable to regard change of thought in the community, perhaps involving a certain change of habit, as necessarily indicating some degeneration. He did not believe that the changed ideas and habits of the people, although in some respects they might be mistaken, indicated any deterioration in the race. There were good reasons why many people desired to limit their families, but alongside that change it was undoubtedly true that children were better looked after to-day than they had ever been in the history of the country. So far as the medical profession was concerned he thought that any change of view might be due in part to that altered emphasis which was constantly being impressed upon the medical man whereby, instead of having as his one preoccupation the immediate problem of the sick person in front of him, he had now been instructed in the teaching of preventive medicine, and was always being told to look ahead, to anticipate, and to prevent. Half unconsciously there had come increasingly into the profession the idea of the good of the community, not the individual only. That in itself brought about an enormous change of thought, with a widening of horizons and an increased number of considerations to determine a given line of treatment.

Mr. V. B. GREEN-ARMYTAGE considered that those three elastic words which it was considered might be incorporated in the Act to give a ground of permission for legal abortion, "risk to health," were very dangerous. Who of them could define "risk to health"? It was an unscientific term. The unmarried mother was a person for whom one often felt a great deal of sympathy, and yet, after all, Leonardo da Vinci and Michelangelo were illegitimate children. What did it all boil down to? If the surgeon had no guilty intent, if he was perfectly honest in what he did, and if he took the precaution of calling another doctor into consultation, he would never in the present state of the law be convicted. There was no such thing as an illegal operation if there was no guilty intent.

Legal Views

One or two barristers present contributed to the remainder of the discussion. Mr. E. D. WETTON mentioned the desirability that any such operation should only be performed after two medical men had consulted. He thought also that words might be inserted in an Act of Parliament to indicate that the operation might be performed when it could be shown that the health of the mother would be permanently injured by having a child. Mr. G. K. ROSE (metropolitan police court magistrate) said that it astonished him to find that as the years passed by nothing was done actively to remove the stigma which attached to the illegitimate child.

Mr. GEOFFREY RAPHAEL said that his quarrel with Mr. Bourne was that his action had served only to emphasize the differences which existed between the law and the practice of medicine. It had done nothing to reconcile those views. So far from it being true that the law had been changed by that judgment, it had not been changed at all. Mr. Bourne was in respect of this case butting against an open door. Nobody would have ever dreamed of suggesting that Mr. Bourne in pursuance of his practice was committing a criminal offence. But of course when Mr. Bourne said, "This is what the Act says, and I propose to defy the Act and invite Scotland Yard to prosecute me," poor Scotland Yard could do nothing else. But that argument which availed Mr. Bourne, quite properly, at the Central Criminal Court might be advanced equally by professional abortionists, who did such incalculable harm.

At an extraordinary meeting of the Council of the Brighton and Sussex Medico-Chirurgical Society Mr. Douglas A. Crow was elected president to fill the vacancy caused by the death of Dr. J. G. Hayes. On November 3 Dr. H. G. McGregor read a paper entitled "Constitution." On December 1 Mr. D. A. Crow delivered his presidential address entitled "A Blind Man with a Lantern." At this meeting a collection for the B.M.A. Charities Fund produced more than £27.

JOSEPH S. BARR: INTERVERTEBRAL DISK LESIONS AS CAUSE OF SCIATICA

(For Legends *see* Text)

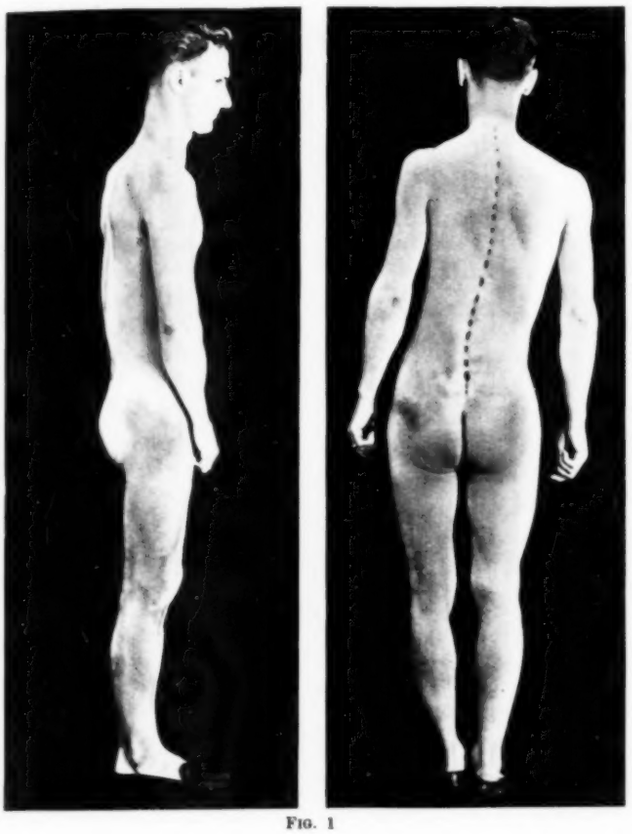

FIG. 1

FIG. 2

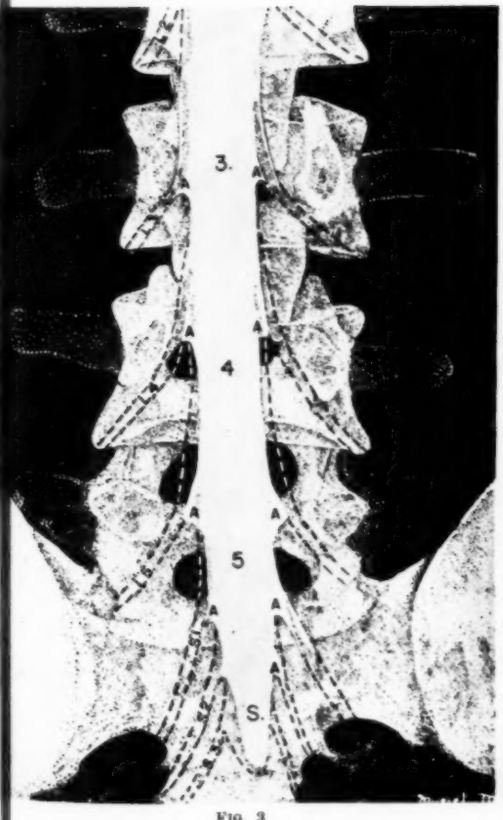

FIG. 3

FIG. 4

FIG. 5

JOSEPH S. BARR: INTERVERTEBRAL DISK LESIONS AS CAUSE OF SCIATICA

(For Legends *see* Text)

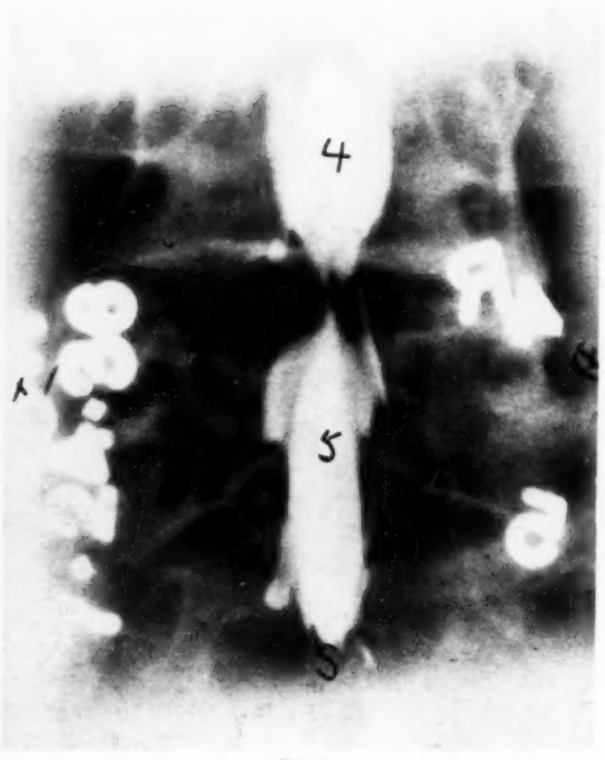

FIG. 6

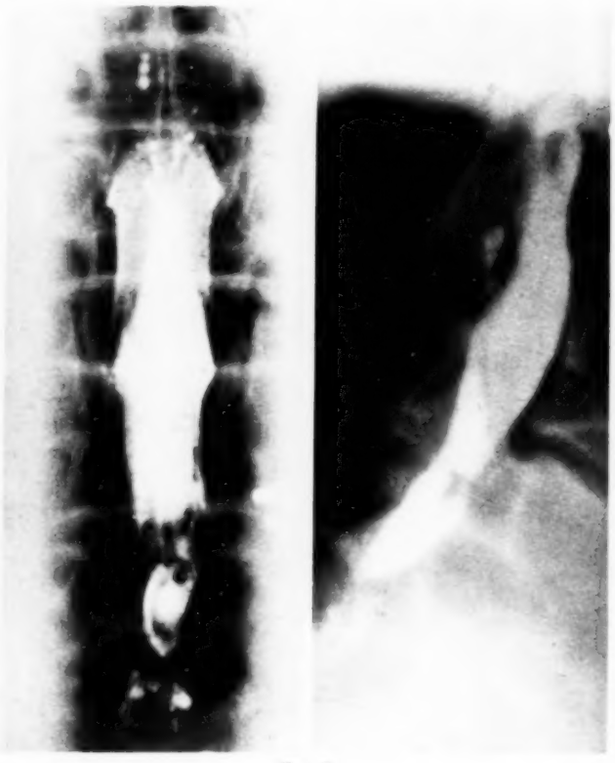

FIG. 7

EDWARD R. ELKAN: THE XENOPUS PREGNANCY TEST

FIG. 1.—*Xenopus laevis* Daud. Female ovulating after injection with pregnancy urine.

FIG. 2A.—*Xenopus laevis* Daud, female. Note valves on both sides of external opening of cloaca.

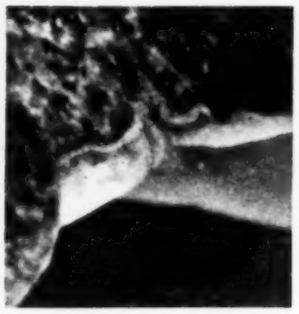

FIG. 2B.—*Xenopus laevis* Daud, male. Note absence of valves at external opening of cloaca.

FIG. 3.—Test jar for xenopus pregnancy test. The centre of lid is perforated. The toad sits on a platform; the eggs fall to bottom of jar. Note typical attitude, holding nostrils above surface of water.

W. PAGEL AND LAWRENCE ROBERTS: BEHAVIOUR OF TUBERCULOUS CAVITIES IN THE LUNG UNDER ARTIFICIAL PNEUMOTHORAX TREATMENT

FIG. 1.—Patient aged 25. Skiagram of 25/6/37, showing fibro-caseous tuberculosis, with two cavities in right lung.

FIG. 2.—Same case, 28/9/37. Artificial pneumothorax. Three cavities are now visible, and there is an adhesion opposite cavity A and another opposite cavity B.

FIG. 3.—Same case, 24/11/37. Note disappearance of atelectatic zone formerly encircling cavity C.

FIG. 4.—Same case, 24/2/38. Adhesions have been divided and no cavities are now visible in the skiagram.

FIG. 5.—Macroscopic view of the diseased right lung after necropsy, showing the three cavities. Cavity B appears as a solid round focus.

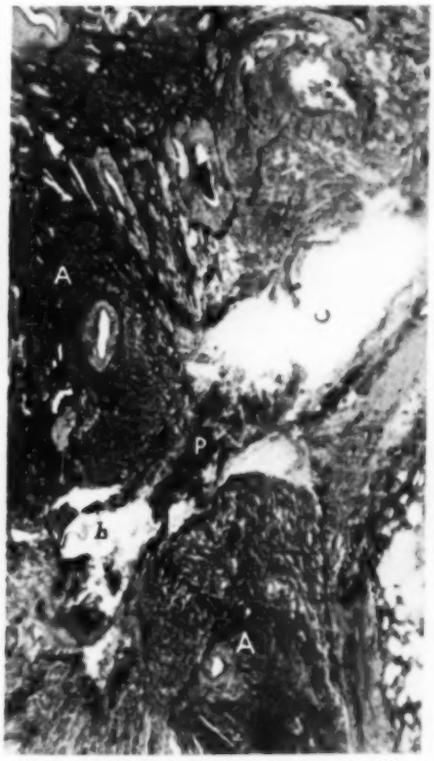

FIG. 6.—Microscopical view of cavity (c) with its draining bronchus (*b*) and the plug (P). A indicates atelectatic lung tissue.

J. F. S. ESSER: USE OF THE SKIN OF FEMALE BREAST IN PLASTIC SURGERY

FIG. 1.—Case I, showing stump inserted in the breast.

FIG. 2.—Case I, showing the stump after healing of the mamma skin covering the bony end.

FIG. 3.—Case III, showing patient's hand completely healed, both as regards skin cover and mobility of thumb.

G. LAING BROWN: SPONTANEOUS PNEUMOTHORAX AS A COMPLICATION OF ARTIFICIAL PNEUMOTHORAX

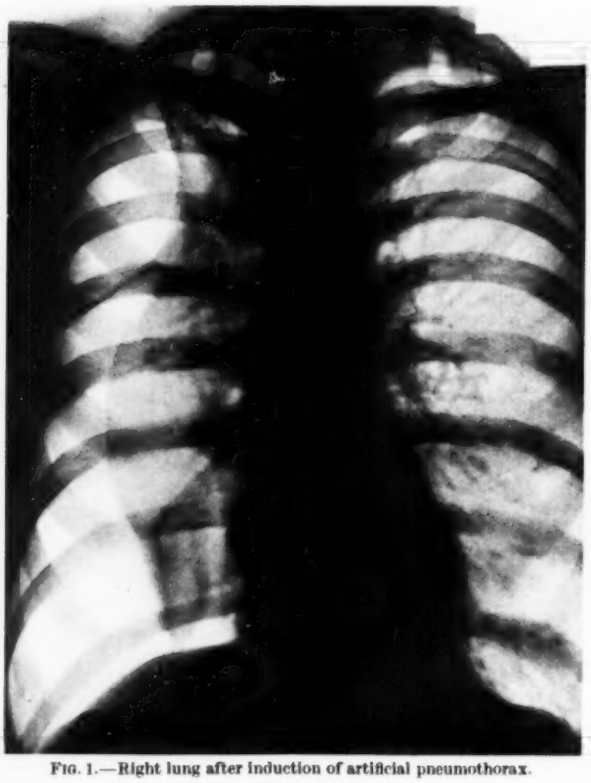

FIG. 1.—Right lung after induction of artificial pneumothorax.

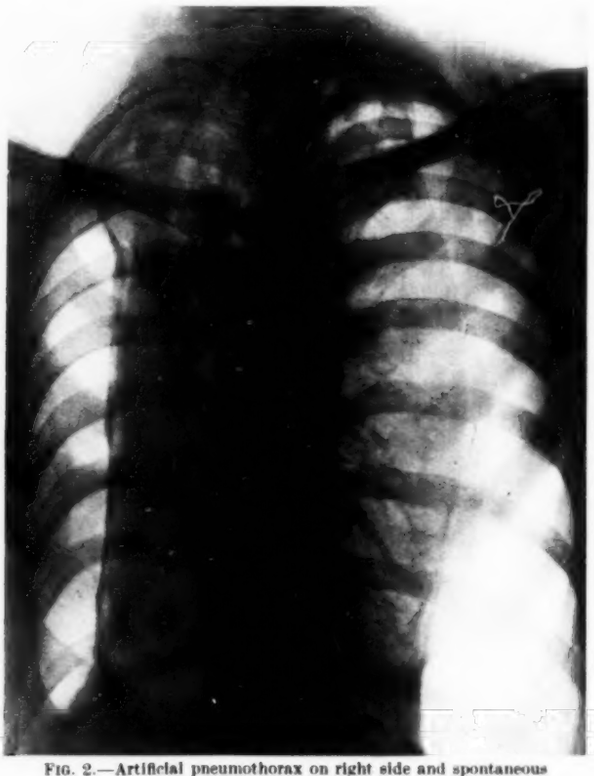

FIG. 2.—Artificial pneumothorax on right side and spontaneous pneumothorax on left.

Local News

ENGLAND AND WALES

Old Epsomians

The sixty-first annual dinner of the Old Epsomian Club was held on December 8, with Mr. S. J. Holford, L.D.S., in the chair. After the loyal toast had been honoured Mr. J. S. Cotman proposed the health of the president in a brief speech in which he referred to the president's athletic achievements and to his eminence as a dental surgeon. In reply Mr. Holford expressed his appreciation at being elected president for the coming year, and entertained the company with reminiscences of his early days at the school. In responding to the toast "Epsomia," the head master, the Rev. A. C. Powell, said he would like to express the gratitude of the school to last year's president, Colonel Crawford, who had proved to be one of their greatest benefactors. He then gave some figures which indicated the increasing success of Epsom College in gaining scholarships at the senior universities. In sport the tradition of the school was also well maintained, especially in rugger. The head master concluded his speech by mentioning the admirable spirit shown by the school during the recent crisis. In welcoming the guests Sir Cosmo Parkinson said he would like to congratulate Dr. Robert Hutchison on his high position as President of the Royal College of Physicians, and he mentioned that Mrs. Hutchison was the only woman member of the College Council at Epsom. He coupled the toast with the names of Dr. Robert Hutchison and Mr. D. C. Barclay, chairman of the College Council. In a brief reply Dr. Hutchison said that it was a privilege for those guests who were not Old Epsomians to be admitted to such a "family gathering" as this evidently was. Epsom, he said, he had always associated with three things: salts, the race-course, and the school. Mr. D. C. Barclay, also responding for the guests, considered that old boys' clubs or societies were an important part of the life of a school.

Epsom College: St. Anne's Scholarships

The Council of Epsom College will shortly award several St. Anne's Scholarships for girls. Candidates must be fully 9 years of age and must be orphan daughters of medical men who have been in independent practice in England or Wales for not less than five years. The value of each scholarship is dependent upon the means of the applicant and the locality and fees of the school selected. Forms of application for these vacant scholarships can be obtained from the Secretary of Epsom College, 49, Bedford Square, W.C.1, and must be completed and returned by January 1, 1939.

The London Emergency Bed Service

At a meeting of the Council of King Edward's Hospital Fund for London on December 13 the president, the Duke of Kent, opened the proceedings by reading a brief message of encouragement from the King. His Royal Highness in his address referred to the various activities of the Fund, including the emergency crisis distribution; the provident scheme for the middle classes, in which the British Medical Association had given valuable assistance; the promotion of a Bill to exempt voluntary hospitals from the incidence of rates; and the distribution of grants, amounting in all to £305,000, to hospitals.

The chairman of the Voluntary Hospitals Emergency Bed Service Joint Committee, Sir Harold Wernher, presented a report on the provision made by that committee, which was set up last summer to facilitate the admission of acute and emergency cases to voluntary hospitals in London, the King's Fund undertaking to provide the necessary finance and supervisory staff. The Joint Committee of the King's Fund and the Voluntary Hospitals Committee responsible for the Service consists of Sir Harold Wernher, Lord Luke, Sir Ernest Pooley, Mr. O. N. Chadwyck-Healey, Dr. A. M. H. Gray, Dr. Geoffrey Evans, and Mr. A. J. Gardham. (Articles on the work of the Voluntary Hospitals Emergency Bed Service appeared in the *Journals* of June 4 and June 18, 1938.)

A staff of twelve operators was appointed and given a preliminary training with the help of the hospitals. The Service was opened on June 21. Initially it was open from 8 a.m. to 10 p.m. only while the staff gained experience and confidence in their duties. A full twenty-four-hour service was brought into operation on October 8. The Service telephones every hospital once or twice a day according to a special schedule and receives a report of the number of beds vacant; this report is subdivided into some forty categories according to the sex and medical category attaching to each bed. The number of cases presented by doctors has grown steadily and is still growing week by week. By the end of November 2,800 cases had been dealt with. On no occasion has the Service been unable to find a bed for a genuine emergency, and only in exceptionally difficult cases has it taken more than ten minutes to arrange admission. During this time the necessary data have to be given by the doctor, and he has to decide to which hospital where there is a bed available he would like to send his patient. The hospital has to be telephoned and the bed booked, often an ambulance called, and finally the doctor is telephoned to confirm that all is in order. It is estimated that some 25,000 telephone calls in all have been made, the majority of which are concerned with keeping the record of beds up to date. Over 1,200 doctors have used the Service already, and this number grows daily. Many doctors have written expressing their appreciation, and in some cases stating that the life of the patient has been saved by the rapidity of the admission to hospital. The Service has been asked to arrange ambulances for about one-third of the cases it has handled. The procedure has worked smoothly, and gratitude is expressed to the London Ambulance Service of the London County Council and the Home Ambulance Service of the Order of St. John of Jerusalem and the British Red Cross Society for their co-operation. During the crisis provisional arrangements were made for moving the Service to safer quarters in the basement of a large house in the suburbs, but the move did not actually take place. Since then negotiations have been in progress to arrange for these premises always to be available for the Service should evacuation ever become necessary.

A Local Inquiry into Malnutrition

During the year 1938 the Ipswich Committee against Malnutrition has conducted an inquiry into the food resources of more than 100 working-class families, and the results have been made into a pamphlet by Dr. A. M. N. Pringle, who has just retired after thirty-one years' service as M.O.H. for Ipswich. The facts as to family income and expenditure are all carefully tabulated, with the amount available for food set against the B.M.A. minimum. At the end averages are worked out in income groups, with interesting results. It is seen; for instance, that fixed charges (rent, fuel, light, insurances) take a much larger proportion of the smaller incomes: they increase with income, but not to the same extent as food. The average amount per head per week ranges from 4s. 6d. to 7s., though in six cases it is below 3s. Alongside these figures Dr. Pringle gives an interesting summary of the main facts about the effect of nutrition on health and the essentials of a balanced diet, and examines how far these families are able to obtain it. Finally, nineteen food budgets are given in detail, with a comment from the doctor on each one, preceded by general conclusions. Milk is everywhere insufficient, usually very much so indeed; so also are butter, eggs, and cheese. Fruit and green vegetables are only purchased in meagre and insignificant quantities. Protein foods are below standard both in quantity and in quality. Bread is the basic food, and, alas! it is white bread, from which most of the protein and mineral elements have been removed. The results

of this independent investigation bear out the conclusions reached in other areas. Ipswich is a comparatively prosperous town, and the low level of nutrition is possibly not so widespread as in less fortunate places, but it exists there to a larger extent than one would have expected, and the figures show that if the family is not quite small it exists even when the father is in work and earning up to 50s. per week. Copies of the report can be obtained, price 4d. post free, from the secretary, Mrs. Lewis, 41, Brunswick Road, Ipswich, or from the secretary of the London Committee against Malnutrition, 19C, Eagle Street, Holborn, W.C.1.

Chelsea Clinical Society Dinner

The annual dinner of the Chelsea Clinical Society was held at the Rembrandt Hotel, S.W., on December 6. In proposing the toast of the Society, with which he coupled the name of the president, Sir Eric Maclagan referred to the many doctors he had dined with at different times, most notable among them being Sir Clifford Allbutt. The president of the Society, Mr. Duncan Fitzwilliams, in replying, delighted his listeners by presenting a condensed history of Chelsea. He sketched the careers of the many owners of King Henry's Manor and what was known as "Old More's Manor" (the estate of Sir Thomas More). These houses finally became the property of Sir Hans Sloane, at that time President of the Royal College of Physicians, who owned almost all Chelsea, and whose remarkable collection of coins, fossils, manuscripts, and curios formed the nucleus from which the British Museum was created. Dr. Kenneth Eckenstein, honorary treasurer of the Society, proposed the toast of the guests in a characteristically witty speech. Among the guests were the presidents of the Medical Society of London, the Hunterian Society, and the West London Medico-Chirurgical Society. A reply on their behalf was made by Mr. C. W. Gordon Bryan, the honorary treasurer of the Royal Society of Medicine.

Human Milk for Delicate Babies

A National Mothers' Milk Bureau will be opened by the National Birthday Trust Fund at the new Queen Charlotte's Hospital on January 1, 1939. The bureau will be under the supervision of the staff of Queen Charlotte's Hospital, but the cost of maintenance will be borne by the National Birthday Trust Fund. The object of the scheme is to make available human milk for delicate babies for whom it has been medically prescribed. The bureau will be provided with the most modern equipment and freezing plant through the generosity of Sir Julien Cahn, chairman of the National Birthday Trust Fund.

Filming Fracture Work

Now that cinematography has proved its value in medicine we may perhaps have to devote a corner of the *Journal* to "film notes." T. J. Smith and Nephew, Limited, have been at some pains to prepare a film on the functional treatment of fractures, and they claim with justification that it is based on the well-known report on fractures issued by the British Medical Association in 1935. The producers have not entirely concealed their belief that "cellona" plaster bandages are eminently suited to the modern treatment of fractures, but it is fair to say that the film is instructional from first to last. There are about 2,000 feet of 16-millimetre film, and it takes about one and a half hours to show. The four fundamentals of successful fracture treatment—namely, (1) segregation, (2) continuity of supervision, (3) after-care, and (4) unity of control—are covered most admirably in the opening section. Then follow other sections dealing with the treatment of various common fractures, such as Colles's, supracondylar fracture of the humerus, tibia, and fibula, Pott's fracture, crush fracture of a vertebral body, and many others. The film was made at a well-known fracture clinic, and it is a delight to see portrayed the unhurried efficiency, the thoroughness and care, with which the work is done. It is, perhaps, the one danger of this film that it makes fracture work look so easy. Possibly it is to those who have had long and arduous experience, but the daily price that has to be paid for success is constant vigilance and the most patient attention to detail. Only a few shots show mistakes to be avoided, and rather more warning notices might, perhaps, have been included. As a means of teaching this film has only limited usefulness; as an instructive entertainment it is very good, and as a way of showing just how the thing should be done it is superb. Admitted that there may have been some stage managing (and probably no such admission need be made), this film shows what is actually being done in well-organized fracture clinics, and it is to be hoped that there will soon be more centres that could stand the scrutiny of a candid camera.

IRELAND

Irish Medical Reunion in London

The annual autumn meeting of the Irish Medical Schools and Graduates Association was held in the Rembrandt Hotel, London, on December 1, and consisted of a dinner followed by a dance. The president, Mr. Johnston Abraham, and Mrs. Johnston Abraham received the guests, who included Lord and Lady Stopford and the Rev. Canon Hannay and Miss Hannay. Lieutenant-General William P. MacArthur, the Director-General of the Army Medical Services, was present, and received on behalf of Captain J. W. Orr, *M.C.*, R.A.M.C., the Arnott Memorial Medal, which was awarded by the society to Captain Orr for bravery under fire on the Indian Frontier. Sir William de Courcy Wheeler proposed the toast of the guests, to which Lord Stopford replied, and Canon Hannay (George Birmingham) proposed the toast of the association, and referred to the literary gifts of the president, who is the author of *The Surgeon's Log* and *The Night Nurse*. The dance was enjoyed by the members, their wives, families, and guests.

Honorary Degree for Sir W. Langdon-Brown

The National University of Ireland, on December 8, conferred an LL.D. degree, *honoris causa*, on Sir Walter Langdon-Brown. The degree was conferred by the Chancellor of the University (the Prime Minister, Mr. E. de Valera); and Professor Henry Moore, in an introductory speech, said that while Sir Walter Langdon-Brown's name was familiar to every member of the medical profession through his medical writings and lectures, his repute was high in literary and scientific circles through his philosophical and scientific works. In addition to holding a leading position as a consulting physician in London he was Emeritus Professor of Physic in Cambridge University.

"He has held the Croonian Lecturership of the Royal College of Physicians of London, and he was the Harveian Orator of the same college. He is the author of several standard textbooks and papers relating to medicine, psychology, and philosophy. His latest book, *Thus We Are Men*, is a masterpiece, wherein, with a purity of English style rarely seen to-day, he discusses life in relation to philosophy and psychology, and in which he shows a deep knowledge of human nature. During the time that he has been attached to this University as Extern Examiner in Medicine his colleagues have grown to appreciate deeply his scholarly attainments."

After the conferring of the degree Sir Walter Langdon-Brown gave a lecture at University College, Dublin, entitled "Medicine—Yesterday, To-day, and To-morrow." It was attended by the Prime Minister, and the President of the College, Dr. D. J. Coffey, was in the chair. There were almost 400 people in the audience and the lecture was applauded for several minutes at its conclusion.

Ulster Medical Society

At the meeting on November 17 of the Ulster Medical Society, the president, Dr. J. McCloy, in the chair, Professor J. H. Biggart read a paper on diabetes insipidus. After briefly describing the history from the early knowledge of Willis (1674), the discoveries of Claude Bernard, the experimental work of Schafer and Hering, and the clinical observations of Farini and van der Velden, the speaker dealt with recent experimental work and the anatomical findings in eight human cases. In five of these eight cases, he said, pituitrin controlled the polyuria, and in each of these the lesions found were so localized as to interrupt the supra-optic-hypophyseal nervous tract to the pars nervosa, and had destroyed completely this part of the pituitary gland. In two of the cases the damage to this nerve pathway had resulted in marked atrophy of the pars nervosa, suggesting that the pathway had a definite influence on this structure. In three patients the polyuria was not controlled by pituitrin, the lesion involving not only the anterior hypothalamus but extending sufficiently to destroy the nuclei of the tuber cinereum. The syndrome had been experimentally reproduced in fourteen dogs, and the findings in these animals supported the suggestion arrived at from a study of the human material that interruption of the supra-optic-hypophyseal tracts resulted in a cessation of the manufacture of the anti-diuretic hormone. Studies of human cases and experimental material also showed that the anterior pituitary played an important part in the development of the syndrome.

INDIA

Madras Ophthalmic Hospital

A triennial report and statistics have been issued for the Government Ophthalmic Hospital, Madras, for the years 1935–7. Plans were drawn up for the construction of new quarters for the nursing staff, an extension and ticket hall for the out-patient department, and a dining hall for patients, at a total estimated amount of 43,000 rupees. There was but little change in the numbers of patients treated during the period under review, and the nature of the diseases treated was much the same as in 1936, some details of which were given in the *British Medical Journal*, 1937, **2**, 550. Over 100 medical students were trained in each of the three years. This institution has a wealth of varied clinical material, but its accommodation is at times very severely strained.

Enteric Fevers in the Armies

A point of special interest in the second volume of the report for 1936 of the Public Health Commissioner with the Government of India is the low incidence of enteric fevers in the armies, which was particularly striking among Indian troops. Part of the reduction among enteric group cases was possibly due to better diagnosis of the mild typhus group cases, but it is added that this factor is inapplicable to the great reduction in both typhoid and paratyphoid A group (Indian) which occurred during that year, while the ratio for typhus fever (Indian) is the same as that for 1934 when the figure for enteric fever incidence was the lowest on record. The number of deaths in both British and Indians from enteric fever was also greatly reduced. There was no corresponding reduction among the civil population but rather an increased incidence, nor have there been any striking changes in the general hygiene of military areas. Growing interest, however, is being taken in child welfare among their families by all Indian units, and many enteric cases were detected which would otherwise have escaped notice, suitable treatment being given at once. Another focus of infection is thus being eliminated. Special note is made of the improvement in the T.A.B. vaccine supplied by the R.A.M. College and the Central Research Institute, Kasauli, during the last few years. In the 1935 report attention was called to the increasing number of apparently ambulant infections among the fatal typhoid cases. For the total enteric group of fevers the statistics are similar to those of previous years for the various post-inoculation periods, but in the bacteriologically proven cases there was in 1936 a considerable fall in the percentage of cases occurring in the first six months after inoculation, and a definite rise in the twelve to eighteen months period. The results obtained by agglutination tests were again inconclusive in both "H" and "O" agglutination. Comparative tests of Dreyer's technique and that of Felix with standardized T.O. suspensions had not yet yielded sufficient data for definite opinions except that in the great majority much higher titres of "O" agglutination were shown to be present by the second method.

During 1936 the admission ratio for dysentery fell by 4.6 per 1,000, being the lowest for many years, but this was offset by an increase in the admissions for diarrhoea and colitis, leaving a decrease of 1.4 per 1,000 for the whole group of diseases. Reduction also occurred in the admissions for amoebic hepatitis, and only two cases of liver abscess were admitted. Cases were as usual sporadic, and the greatest incidence corresponded with the fly season. It was observed that units arriving recently in stations after train journeys produced small crops of cases. It is reiterated that this group of diseases is, under peace conditions, largely passed on from the insanitary conditions prevailing among the civil community. The striking range of the fly and the absence of any reliable method of producing active immunity against the numerous varieties of dysentery bacilli prevalent among the population of India account mainly for the fact that the admission rate to hospital among British troops in India in 1936 was as high as 42.1 per 1,000, compared with an admission rate of 1.5 per 1,000 for the enteric group of fevers.

Opium Smoking in India

Brevet Colonel R. N. Chopra and Mr. G. S. Chopra have published in the *Indian Medical Gazette*[1] a series of articles on "The Opium Smoking Habit in India." The history of the custom, which was prevalent in China from the beginning of the seventeenth century, but not in India or Persia until the nineteenth century, is related. Smoking, as opposed to eating, opium has not been largely prevalent in the Dependency except in Assam and Burma. It obtains mostly in the larger towns and among the poorer inhabitants. In 1932–3, 28,448 lb. of opium were consumed in Assam, or 30 lb. per 10,000 of the population. The ratio of smokers to eaters in Assam is 1 to 4. The former are more numerous in the hilly country than in the plains. Addicts are as 1 to 126 in the population, but the number is declining under Government restrictions and registration of smokers. In Burma opium has been in use for 300 years, and in 1933 there were 53,000 opium eaters and smokers in that country. The official view is that opium smoking is a social vice, and Colonel and Mr. Chopra recall the view of the Royal Commission of 1895 that the eating of opium is relatively harmless compared with opium smoking. It is also much cheaper, since it is stated that the effects of smoking 180 grains a day can be obtained by the ingestion of 10 grains. The objective sought after is a state of euphoria, and it is the quest of the poor and miserable as an escape from their surroundings. Smoking is mostly resorted to in company in dens, sometimes with social functions or quasi-religious observances. Opium eating, on the other hand, is practised alone and often furtively; but the habit is more easily cured than is that of smoking. The authors appear to share the official view that a great distinction is to be drawn between the effects of eating opium compared with those of smoking; nevertheless they observe that "no scientific data are available to support the view that smoking of opium is more harmful than eating to the individual addict."

[1] Vol. lxxiii, Nos. 2, 3, and 4 (February, March, and April, 1938).

Correspondence

Surgical Approach to Facial Neuralgia

SIR,—I was profoundly impressed by Mr. G. F. Rowbotham's paper on the treatment of pain in the face by intramedullary tractotomy in your issue of November 26 (p. 1073).

What impressed me was not that the pain had been relieved (it should be, if our anatomy and physiology books are reliable) but that he was able by his analysis of the patient's description of certain subjective sensations to make a diagnosis of "primary" pain, apparently without having searched for those pathological conditions in the area subserved by the sensory branches of the trigeminal nerve which are commonly found to be productive of any and every type of pain in the face. I hope that Mr. Rowbotham will assure us that he carried out an exhaustive examination of the nasal sinuses and the teeth before he made his very skilled inroad into the central nervous system.

If he is in the habit of taking the quality of the pain (as described by the patient) for a guide as to its "primary" nature, I would refer him to the very interesting observations upon somatic pain recently recorded by Sir Thomas Lewis (*British Medical Journal*, 1938, **1**, 321), which indicate how misleading a patient's description of pain may be.

Sluder (*Trans. Amer. laryng. Ass.*, 1912, **35**, 42) painted the interior of the sphenoidal sinus with 20 per cent. cocaine and found that the whole of the face on the same side became anaesthetized, an observation which emphasizes the intimate anatomical relation between this sinus and the Gasserian ganglion. It helps to explain how absorption of toxins under pressure from a blocked sphenoidal sinus can inflame the ganglion of the trigeminal and lead to pain anywhere in its distribution. Since sphenoidal sinus work has become a commonplace of rhinological practice, it is so usual to find that facial pain can be relieved by adequate sinus ventilation that one had forgotten that there were still medical men who believed in essential neuralgia. I submit that the word "primary" in connexion with pain is inapplicable; and I would suggest that an experienced rhinologist might be allowed to examine pre-operatively the next case which Mr. Rowbotham has marked down for a procedure which, as he so rightly remarks, "makes an interesting neuro-anatomical experiment."—I am, etc.,

London, W.1, Dec. 5. BEDFORD RUSSELL.

Cancer of the Breast

SIR,—Mr. G. Gordon-Taylor's recent address on cancer of the breast (*Journal*, November 26, p. 1071), with his follow-up of cases operated on in the last thirty years, shows results which are indeed remarkable, especially so with an 84 per cent. survival rate in Stage I cases after ten years. The fact that these results were achieved by surgery alone without ancillary treatment by deep therapy will be disturbing to many who, like myself, have been accustomed to send all cases for post-operative irradiation.

There are two points on which perhaps one might venture to criticize Mr. Gordon-Taylor's figures: in the earlier cases, say before 1925, some cases were probably rejected as inoperable and therefore do not appear in the totals. These cases would affect particularly the Stage III group, to which most of them belong, and for comparison with modern statistical tables compiled by radiation centres these inoperable cases must be added to the totals in computing the percentage of survivors.

There is another point: the difficulty of accurately "staging" cases into groups is a very real one to get comparable figures for comparison between different methods of treatment. The division between Stages I and II, depending on whether axillary glands are present or not, is a reasonably precise one. The division between Stages II and III is less precise, and if (as I presume) staging in Mr. Gordon-Taylor's cases was based on the notes of the cases and not definitely carried out at the time of examination, some confusion might easily arise in differentiation between these two groups. If this were so, then his results in both Groups II and III would be vitiated to some extent by the failure to include the inoperable cases. Thus the figures of 25.2 per cent. survivors at the end of ten years and 35.3 per cent. five-year survivors, which are obtained by combining Mr. Gordon-Taylor's Group II and Group III cases, should in reality be considerably lower.

A survival rate of 84 per cent. after ten years from such an unexceptionable source and by surgery alone is of the utmost value as a standard of what can be achieved, and helps to clarify one's ideas for future comparison with the combination of surgery with radiation in breast carcinoma.

The Group III case benefits enormously by radiation; Mr. Gordon-Taylor recognizes this inasmuch as he has sent twenty-eight such cases for radiation alone between 1925 and 1935. The Group II case in my experience has benefited considerably by post-operative radiation, though it is too early yet to give figures extending over a sufficient period of time to judge the final results.

With regard to the Group I cases, like Mr. Gordon-Taylor I rely on surgery, but in addition give post-operative radiation. I have often wondered whether it was necessary in these cases—the figures which he gives incline me to think that it is not, and that in the ordinary Group I case reliance can be placed on surgery alone, and post-operative radiation is unnecessary.—I am, etc.,

Birmingham, Dec. 9. SEYMOUR BARLING.

Neck Plaster

SIR,—The very interesting article by Mr. John C. Nicholson in the *Journal* of August 27 (p. 464) describing his experiences as a patient encourages me to write and say how fully I agree with his remarks about the cold wet plaster. In February last I had a motor-car accident which I did not regard very seriously, thinking I had escaped with two broken ribs and some bruises, but eventually I had my neck *x*-rayed, the film revealing fractures of the transverse processes of the fourth and fifth cervical vertebrae. Although this was nearly a month after the accident it was decided that I should go into plaster as I was still getting so much pain.

I cannot remember how many patients I have told not to fuss about their plaster, but having had one put on—even in the dry heat of Rajputana, with the thermometer at 108° F.—I shall never do so again. I shall never forget the misery of the wet, cold, and irritating plaster round my neck and head. Mr. Nicholson is perfectly right in his references to the little pieces of plaster which cause so much irritation, and which in a neck plaster are inevitable owing to the movements of the lower jaw. I must admit that after a few days I

had my plaster removed and put myself into a splint in the shape of a cross, which I wore for some weeks. It did not interfere with my work, except that cystoscopies were difficult as one could never get one's eye at the right angle. With a stiff neck ordinary surgery, both abdominal and ophthalmic, was perfectly easy, as one learnt to bend from the hips very quickly.

Never again shall I inflict on a patient a neck plaster if it is possible to fix him adequately with splints, which I believe to be the case if one pays sufficient attention to the details of their manufacture and fitting.—I am, etc.,

E. W. HAYWARD,
Rajputana, Nov. 22. Principal Medical Officer, Jodhpur.

Adrenaline Treatment of Asthma

SIR,—Dr. Alexander Francis's experience regarding the removal of polypi in aspirin-sensitives (December 3, p. 1179) agrees with mine. The removal of bone in them is usually disastrous. These patients have in an unusual degree the capillary permeability characteristic of allergy. At operation their noses flood with blood and the field is hidden. But the polypi have to be removed. They should not be tackled, however, till the patient has had a course of general treatment for a month or two. This includes an organic compound of calcium plus vitamin D but minus milk. Such treatment has served me well with a retired Army officer, asthmatic and aspirin-sensitive. The polypi recurred until this treatment had time to act, and also until I used ionization with a zinc needle buried in any buds that threatened to develop into polypi. The patient has now neither asthma nor rhinorrhoea. He never needs adrenaline.

That *raw* milk is a fertile source of asthma I have found for forty years. But it is not generally known that, short of asthma, it may cause rhinorrhoea. Milk rhinorrhoea has become common since the institution of "school milk." That raw milk should be stopped before trying the removal of the stellate ganglia for persistent rhinorrhoeas—as has been recently done to a lad who persistently took milk—does not seem to dawn on the rhinologist, nor the need for stopping it in treating hay fever. Other vitamins than D are of course important, and it is possible that foods rich in vitamin K—cabbage, spinach, liver—may be specially helpful because of the importance of this vitamin in the formation of prothrombin.—I am, etc.,

Glasgow, Dec. 4. JAMES ADAM.

SIR,—I would like to thank Dr. Alexander Francis (*Journal*, December 3, p. 1179) for his courteous reply to my letter and for giving full particulars regarding the patient under discussion. As a matter of fact, I entirely agree with him as to the inadvisability of indiscriminate removal of polypi, but have certain suggestions to offer in response to his request.

1. Careful analysis, as recommended by Maxwell, to determine the prime source of the attacks. Maxwell's classification is, incidentally, as follows: (*a*) an allergen (bacterial; non-bacterial; bacterial plus secondary non-bacterial; or non-bacterial plus infection or toxaemia); (*b*) nasal; (*c*) broncho-pulmonary; (*d*) alimentary; (*e*) endocrine; (*f*) psychological.

2. Nasal endoscopy by a competent rhinologist—to avoid missing a latent sinusitis. Sphenoidal and post-ethmoidal sinusitis frequently play a part in the production of allergic manifestations, and are almost invariably missed by the ordinary rhinoscopies. Suspicious findings demand suction lavage and bacteriological examination of the washings.

3. The protein metabolism may repay investigation. Lapage and Dzinich hold that the liberation of histamine is the determining factor in the allergic reaction, while the former points out that circulating amino-acids and other toxic bodies irritate the autonomic nervous system.

4. Maintenance of the proper balance of potassium and calcium in the tissues and perfect endocrine balance both affect the irritability of the parasympathetic, according to Fraenkel and Bray; therefore any abnormality found should be corrected.

5. Sunshine, ultra-violet light, *x*-ray therapy, and cold douching after hot baths increase the output of adrenaline, so helping to stabilize the autonomic nervous system; while nerve tonics such as zinc valerianate and liquor arsenicalis may be helpful.

6. Strict dietary control is advised by Jay to avoid overloading metabolism or including "allergenic" constituents.

7. Autogenous vaccines are of very limited use (Bray, Theodore Just, and Frederico Nitti).

8. The fact that cutaneous and mucosal sensitivities do not run parallel courses and the changeability of sensitivity from time to time and from place to place negative the value of cutaneous tests and render desensitization rather futile (Bray and Chandler Walker).

9. Small doses of codeine and the giving of a sedative linctus at night are respectively recommended by the same two authors.

10. Sclerosing submucosal injections benefit a number of cases provided there be special indications.

11. Cauterization of sensitive areas is not a very popular measure, though W. Howarth claims improvement in 50 per cent. of asthmatics.

12. Intramucosal autoserotherapy and intravenous peptone have their supporters.

13. Surgery, except for sinusitis when satisfactory results are to be expected, should be extremely conservative (Bray, van Leuuwen, Gill Carey, Moll). A submucous septal resection may leave an irritable ethmoid, while hypertrophic masses and hyperplastic sinus disease should be left severely alone; tonsils should only be removed if definitely infected. Lastly, Chandler Walker, Bray, Lapage, and others all agree that good results follow the removal of septic foci in cases of asthmatic bronchitis.

I hope that some of these suggestions at least may recommend themselves to Dr. Francis, and that with their adoption considerable relief may be afforded the patient.—I am, etc.,

Bath, Dec. 6. C. A. HUTCHINSON.

Cyclopropane and Pulmonary Atelectasis

SIR,—During recent years there has been much discussion concerning the causation of post-operative pulmonary complications. It has been suggested that certain anaesthetic mixtures, such as cyclopropane and oxygen, which contain an abnormally high proportion of oxygen may lead to atelectasis or even major pulmonary collapse, either at the time of operation or subsequently during the post-operative period of recovery. This is due to the fact that oxygen is absorbed from the pulmonary alveoli much more rapidly than atmospheric air. To what extent this statement is true it is difficult to assess, as there are so many other factors involved in post-operative pulmonary collapse. Heavy premedication, obstruction of the airway, post-operative mechanical difficulties in respiration, bronchial spasm due to reflex irritation set up by too high a concentration of ether or (in certain cases) an endotracheal tube, must all play their part, while the current practice of producing an artificial apnoea in order to facilitate the work of the surgeon would appear to be not without danger to the patient.

During the administration of cyclopropane anaesthesia the patient inhales a mixture of gases containing anything up to 90 per cent. of oxygen. After a long operation this over-oxygenation is liable to result in unpleasant

after-effects, such as headaches, nausea, and possibly even mental symptoms in some cases. Moreover, unless the anaesthetist is careful to lower the oxygen percentage by easy stages towards the end of a long operation, the patient may suffer extreme shock on suddenly being transferred from 90 per cent. oxygen to atmospheric air. In order to overcome these objections it is quite easy to administer cyclopropane with ordinary air.

A Y-piece is incorporated with the rubber tube leading to the oxygen flowmeter of a Boyle's apparatus, one limb being connected to the oxygen supply cylinder and the other to a double-bellows as used for Shipway's apparatus. By adjusting the tap on the oxygen flowmeter and squeezing the bellows a steady flow of air at the rate of 1 or more litres a minute may be maintained for any length of time. If desired, a special flowmeter calibrated for air may be fitted to the Boyle's apparatus. During the induction of anaesthesia the rebreathing bag should be about two-thirds filled with air before starting the cyclopropane. Oxygen can be dispensed with altogether, but in practice it is better to adjust the flow of oxygen at the rate of 200 or 300 c.cm. a minute, according to the metabolic requirements of the patient. Subsequent losses due to leakage should be made up with air by means of the double-bellows. Incidentally, by using this technique with the Waters's carbon dioxide absorber the air is delivered direct to the face-piece and thus is not contaminated by the contents of the rebreathing bag.

To prevent misunderstanding, I would like to emphasize that I do not claim any originality in administering cyclopropane with air. It seems reasonable, however, to suppose that the human respiratory system has been evolved expressly for the purpose of inhaling ordinary atmospheric air; whereas the modern tendency of anaesthesia seems to be directed to compelling the patient to inhale anything except this universal and convenient gas, thus contravening the laws of physics and physiology.—I am, etc.,

Newcastle-upon-Tyne, Dec. 5. PHILIP AYRE.

Correct Footwear

SIR,—I am glad to see that at long last someone else has taken up the question of women's shoes and the results that occur from the unsuitable examples of footwear thrust on the female population, pandering to their vanity. I have been interested in the matter for some years from the public health point of view, and only at the end of October, just before I retired, I examined the heels of nearly 2,000 children in the schools of my district. I classified them into three grades of malformation, according to the extent to which the heels were worn and causing the stresses in the foot to become abnormal, and according to the degree of abnormality of the foot causing the heels to wear abnormally. I found a few of the children's heels were so bad that they were completely worn on the outer side, making an angle of 45 degrees, and I had to add two more categories, making five in all. The number of abnormal cases was very high, and for some so far unknown reason was much higher in the normal upper school than in the large central school for children of slightly lower mental attainments.

My attention was first drawn to this matter by watching the waitresses in large multiple tea-shops in London. Some of these in the late evening were to be seen hobbling about, tired out as the result of the pain produced by their footwear. In all these cases the heels were worn on one side, mostly the outer, and it was obvious that the constant abnormal strain was the *fons et origo mali*. One large multiple store that I approached considered making shoes of a standard pattern part of their employees' uniform, but the girls refused to wear anything but a "court" shoe with a needlessly high heel. Vanity ruled the situation.

Anyone who looks at the heels of the crowds in the streets will be amazed at the number of bad heels there are, particularly among the poorer members of the community. I had the idea that much of this might be due to buying second-hand shoes or the handing down of shoes in the family, but the number of cases of this I found was far less than I expected. The psychological damage is often considerable, as the victim seems to think that everyone behind her is looking at her heels. She cannot get away from the fact as, in order to keep her feet decent, she has to buy many more pairs of shoes than her more fortunate sister. A point often overlooked is that these very high heels throw the body balance out completely, and produce stresses and strains far from the feet. When Dr. T. Marlin says (*Journal*, December 3, p. 1159) that "high heels seem to be necessary for about 90 per cent. of our womenfolk" he is merely stating that the necessity is dictated by vanity and nothing else. When I refer to high heels I do not mean the heel of 1½ inches of the "Cuban" type, but the 3-inch or so peg-top, which gives no support save to a perfectly normally balanced foot. Another contribution to the deformity of the shoes is dictated by the ignorant bootmaker, who puts rubber tips on the outer side of the heels of these unfortunates. What they want is support and not a yielding outer edge, which only hastens the deformity of the heel and with it the shoe. A man's shoe requires a double row of large flat-headed nails; a woman's heel smaller nails on the outer side and frequent repair. For the cheaper shoe the man can have a metal heel which can be easily replaced; the trouble is that they are not replaced early enough. Very high heels often deform not only the shoes but ultimately the feet by pushing the toes right forward and crowding them into the front of the shoes. Vanity, vanity, all is vanity!—I am, etc.,

Chelmsford, Essex, Dec. 5. ELWIN H. T. NASH, President, Society of Medical Officers of Health.

The Blood Platelet

SIR,—Referring to your leading article on the blood platelet in the *Journal* of November 26 (p. 1090) it must seem an intrusion on the part of a general practitioner to offer any comment. But the article, with its record of an immense amount of investigation which has so far produced no definite conclusion, naturally makes any medical man wonder why this should be so, and whether it may not be that the formation of the blood platelets is to be sought and found in the blood plasma itself instead of in the bone-marrow, spleen, and lungs. There are myriads of protein particles in the blood plasma. Is it not likely that some change in their relations forms the platelets? And now there follows a letter (December 3, p. 1179) from Mr. J. E. R. McDonagh, who has for many years made a critical examination of the blood and plasma. His views appear to be rational and logical, and are supported by his experiments and research. It would be of interest to have them confirmed and accepted, so that the problem of the blood platelet might be concluded. Mr. McDonagh's studies throw a new light on the problems of medicine in all directions, to my mind, and he reads deeper into the fundamental nature of things than any other investigator does. Further light on the many questions involved would be welcome.—I am, etc.,

Glasgow, Dec. 7. R. O. ADAMSON.

Play Therapy and Child Guidance

SIR,—It is encouraging to those of us whose work lies in the sphere of child psychology to read so wise and sympathetic an appreciation of the value of play therapy for children as was expressed in your leading article in the *Journal* of December 3 (p. 1150). Whereas it is not contended that there is, or should be, only one form of play therapy, it is important for the wise development of this treatment, as of any other, that different forms of this therapy should be distinguished and their origin and evolution known.

Play therapy for children in England arose from two sources. On the one hand, Mrs. Klein and her pupils have used play as the instrument of treatment for children in this country within the psycho-analytic school since 1927. The results of this form of therapy obtained with clinic children are set out in the *Decennial Review of the Institute of Psycho-Analysis*. All psycho-analytic treatment is given individually. Play for group treatment of children in clinics as a method was created in 1928 in the opening of the Institute of Child Psychology (then called the Children's Clinic), having arisen parallel with, but independently of, psycho-analysis. At this time, though the Child Guidance Council had been formed, there was no clinic under the Council in this country; the one existing child guidance clinic (the East London Child Guidance Clinic), one month older than the I.C.P., was under the Jewish Board of Guardians. There was no play at this clinic then, nor in the London Child Guidance Clinic, opened a year later. In 1933 a member of the staff of the I.C.P. joined the staff of the Tavistock Clinic and became its first "play therapist." In 1935, at the request of the West End Hospital, a therapeutic playroom was opened in that clinic under the direction of the I.C.P. in co-operation with the director of the hospital clinic. The methods in use at the Institute of Child Psychology were published in the *British Journal of Medical Psychology* (1931, **11**, Part III), in the *Medical Women's Federation News-Letter* (July, 1938), and *Play in Childhood* (Gollancz, July, 1935). There are, therefore, two clearly formulated methods of play therapy, each with its own theory and technique.

Various child guidance clinics have established playrooms in recent years. It is not yet quite clear whether it would be more accurate to say that the children in these clinics play, or whether systematic play therapy is the therapeutic corner-stone, as is the case with child psycho-analysis and the work of the Institute of Child Psychology. No description has been published, and it is therefore difficult to judge. This distinction is not a mere verbal quibbling, since in evaluating results it must be clear to what method of treatment they apply. In your article you regret the lack of statistics in relation to results of therapeutic play. May we remind you that in your issue of July 30 of this year you published a statistical paper on play therapy for "problem" children, giving the immediate and late results of play therapy as used at the I.C.P. over the period from 1930 to 1935, and that a careful demonstration of results obtained from this form of treatment formed part of the Exhibition of the International Medical Congress for Psychotherapy, Oxford, 1938. As with all medico-psychological work, careful theoretical and practical training is essential for those who are to undertake play therapy. For the last five years a systematic course of theoretical and practical training has been held at the I.C.P., which is designed to provide other clinics with qualified workers for this type of treatment.

There are three statements in your article upon which we should like to comment. "It does not appear suitable for the majority of delinquents over 10 years old, although in some of these cases it has proved useful." This is not borne out by our experience at the I.C.P. We find that, when suitably handled, delinquent children of all ages respond favourably to this form of treatment. No one could appreciate more highly your statement that "much caution must therefore be exercised in putting forward claims for cure when all that has happened is that therapy has coincided with the natural resolution of a transient disturbance." We note also that you state that severe cases are found not to be suitable for group play therapy, but need instead individual treatment. This again has not been our experience, and among the cases put forward in the statistical paper quoted above are included cases of personality deviation, profound debility, and anxiety states which have been present for a number of years and which have been successfully treated by group play therapy, according to the methods used at the I.C.P.—We are, etc.,

MARGARET LOWENFELD,
ETHEL DUKES,
Directors.

Institute of Child Psychology,
London, W.11, Dec. 8.

Treatment of "Angina of Effort"

SIR,—I have read with great interest Dr. R. H. Dixon's article on cure or relief of cases misdiagnosed angina of effort (*Journal*, October 29, p. 891), and I am very glad that he has come to the same conclusions as have several writers before him. An article on angina pectoris, by W. von Alfthan, appeared in the *Tidskrift i Gymnastik*, the official journal of the Swedish gymnasts, during 1901, in which he described three cases of the disease in which cellulitic (that is, fibrositic) areas were found, the removal of which by massage promptly cured the angina. Dr. Wetterwald of Paris also described the same on several occasions, and personally I have had cases which were of the same nature.

I would, however, like to add that sometimes the removal of fibrositic areas is not enough *per se*, but if combined with cervico-dorsal "mobilization" a cure will then result. I have found that a number of patients with functional disorders of the heart, including pseudo-angina, suffer from being very round-shouldered and have, in consequence of long years of disuse, practically lost the power of movement in the region mentioned. Thus many of the nerves connected with the heart come to lie in an area which is practically immobile, and thus perversion of their function may ensue. (For further details see *J. chart. Soc. Mass.*, 1934, **20**, 7; and *Res. Quart. Amer. phys. educ. Ass.*, 1936, **7**, 74.) Restoration of movement in this locality has nearly always gone hand in hand with improvement in the cardiac symptoms.—I am, etc.,

London, W.1, Dec. 7. EDGAR CYRIAX, M.D.

Acute Bulbar Paralysis

SIR,—I was greatly interested in the paper by Drs. D. M. Anderson and J. H. Dixon with the above title in the *Journal* of November 26 (p. 1077).

Fairly recently I saw a patient who almost completely resembles the cases described in this article. At the end of July and in the early part of August four cases of acute anterior poliomyelitis were brought to my notice, all occurring in the same village. Three of the children represented mild forms of the disease, and not at any time did one fear a fatal ending. Each of these children exhibited paralysis of a limb. The

fourth child died. This last patient was a girl aged 6½ years. On July 15 she had a tonsillectomy performed and was soon apparently well and about. On July 30 she complained of severe headaches. The following day she seemed better but complained of a sore throat, and on careful inquiry this seems to have been rather a difficulty in swallowing than any painful condition. On August 1 she still complained of headache, and swallowing became almost impossible. She was sent to the isolation hospital by the practitioner as a "? laryngeal diphtheria." On admission the throat was clear but there was much copious mucous secretion, some respiratory stridor, no cyanosis, pulse 156, constipation. On August 3 there was noted a marked neck rigidity, swallowing of fluids was impossible, Kernig's sign was present, and the plantar responses were of the extensor type. During the day the child became cyanosed and had convulsive attacks, and in the afternoon she died. The final diagnosis was acute polio-encephalitis.

The chief difference between this instance and that of the cases described by Drs. Anderson and Dixon was that the onset of the disease was fifteen days after tonsillectomy, but there are several points of similarity—namely: (1) other cases of acute anterior poliomyelitis were known to be present in the same area; (2) that this child had had a recent tonsillectomy performed; (3) dysphagia was a prominent symptom; (4) the disease was fatal; (5) the condition was that of an acute polio-encephalitis.

After reading the experience of Dr. D. M. Anderson and Dr. J. H. Dixon and the more personal experience described above, I do not think that I would allow a tonsillectomy to be performed on my child during a period when acute anterior poliomyelitis was assuming anything like epidemic proportions.

I am indebted to Dr. D. C. Evans and Dr. E. G. Munro Jones, medical superintendent and assistant medical superintendent respectively of the isolation hospital, for clinical notes after the admission of the case to hospital.—I am, etc.,

A. R. CULLEY,
Medical Officer of Health.

Carmarthen, Dec. 8.

New Menstruation Toilet

SIR,—A number of letters have appeared in your columns at different times referring to the internal sanitary pad. None of these has made any distinction between the (marine) sponge pad, covered with a fine layer of rubber at its external end, sponsored for some years now by certain firms dealing with feminine "beauty" preparations, and the reinforced cotton-wool tampon.

The sponge pad is soft, extremely comfortable, and absorbent, and when carefully introduced so that its upper end lies in front of the cervix can do no mechanical harm. It was first brought to my notice by a patient who found it the greatest boon in hunting. It would be difficult, however, on second thoughts, to imagine anything more repellent than this invention, since it is intended for repeated use (its price varies, according to size, up to 10s.), and women are invited to remove it at convenient intervals during the day, squeeze its contents down the wash-hand basin, rinse it under the tap, and reinsert, a cake of soap being supplied for occasional more thorough "cleansings." The woman who has this pad with her may feel extraordinarily "independent," but it has astonished me that particular criticisms of this method of "hygiene" and reports of infection resulting from the use of such pads have till now escaped appearing in the medical press. Perhaps the sponge pads have never become widely popular, but physicians who are asked for an opinion of the internal pad should not fail to keep in mind the possibility of this type being meant. On the grounds of cost they might appeal to some patients, since, leaving out the risks of infection, they would certainly appear to work out cheaper than other kinds over a period of time.

The other type of internal pad with a cotton-wool basis is firmer, less easy to introduce, less adaptable, and less absorbent, and even in patients accustomed to wearing internal pads may be very painful. It is undoubtedly a more sanitary invention than the last (since it is removed to be destroyed), but what are its precise advantages, one asks, in patients who can (or who have to) adopt such means of internal protection, over the pad long used by theatrical artists, ballet dancers, and probably the majority of women on the Continent—namely, a little self-made roll of cotton-wool about two inches long, thick according to convenience, perfectly soft and adaptable, highly absorbent, inserted just within the vagina not high enough to get "lost," easy to remove and replace a dozen times a day, cost negligible?—I am, etc.,

MARGARET EMSLIE.

London, S.W., Dec. 6.

SIR,—I was interested to read the comment of Dr. E. Lawton Moss (November 26, p. 1113) on the use of absorbent tampons during menstruation instead of sanitary pads. Curiously enough, I have encountered during the past week a case of particularly bad vaginal and cervical infection which the patient herself attributed to the use of such tampons. While it is unlikely that the tampons were the cause of the original infection, it seems more than probable that they were responsible for the unusually severe development of the condition. It does seem necessary that some warning should be given against the non-medical use of vaginal plugs, especially where there is already any suspicion of infection.—I am, etc.,

C. HAMILTON WILKIE,
Director of V.D. Services,
Leicester.

Leicester, Dec. 7.

Decline of Breast-feeding

SIR,—It seems a pity that no medical woman with personal experience of breast-feeding has yet taken part in the most interesting correspondence following Dr. J. C. Spence's admirable article. It is in the hope that others, perhaps with more extensive experience than I, will follow my example that I am now writing. I have breast-fed my two children in spite of the efforts of nurses who were wise and kind, and indeed excellent in every way except in their management of the nursing mother.

The nurse tends to make breast-feeding a major problem. Every feed becomes a battle in which the child is constantly stimulated by pinches and pats; the breast is handled and the nipple gripped and thrust into the infant's mouth in a way which is physically uncomfortable and arouses a quite unreasoning resentment; the attitude is that the nurse and the child are the active parties, the mother merely a substitute for the bottle. All this makes breast-feeding unpleasant, and it is not until she is herself in control and can allow the infant to feed unhurriedly and undisturbed that the mother can find any satisfaction in it. Its effect on the infant is probably equally pernicious. I do not know how many women limit the duration of feeds; I suspect that one of the advantages of breast-feeding (when the supply is adequate) is that the infant takes as much as he wants instead of as much as he ought, theoretically, to need.

In the later weeks of pregnancy and the puerperium the nipples are extremely sensitive, and any handling is objectionable. The discomfort, often severe, which occurs in the first two weeks of breast-feeding is due not to "tender nipples" but to a spasm of the ducts. This is shown by

the fact that the pain is not felt when the infant grips the nipple but a few moments later, when the milk begins to flow. An identical sensation occurs sometimes during a hot bath, and it is then seen that a stream of milk is being forcefully ejected. I think this is important, because it implies that the whole conception of "hardening" the nipples may be fallacious.

The other thing I have learned is that the supply of milk is unaffected by most of the conditions usually cited (I exclude gross undernourishment, severe exhaustion, and a feeble infant, since these are outside my experience). It is probably dependent entirely on endocrine factors, and is certainly related to the menstrual cycle. During five months of lactation I had epimenorrhoea; before each period the supply of milk was enormously increased, so that neither breast was ever emptied; this increase persisted for about a week after the period. During the normal amenorrhoea of lactation the menstrual molimina were present, and there was always a similar accompanying increase in milk supply; in the mid-week of the cycle the supply diminished to such an extent that complementary feeding was considered, but was so resented by the infants that it was abandoned. Instead, the situation was met by increasing the frequency of the feeds; by this means the total yield was probably unaffected, but the infant was much happier, and as the supply increased he no longer demanded the extra feeds. After the first four months of lactation the variation in the yield became less marked (although it was still present), and it was then that the "symptoms" of lactation appeared: hair tending to stand on end, to fall out, and to lose its colour, and insomnia and irritability—curiously like the symptoms of hyperthyroidism.

Although successful breast-feeding is to be aimed at, yet bottle-feeding is infinitely preferable to breast-feeding which is a struggle. There can be few things more worrying than the uneasy fear that the infant is being underfed.—I am, etc.,

Dec. 8. M.B., M.R.C.S.

SIR,—Miss Mary Cunnane's letter (November 26, p. 1112) in my opinion does not so much "challenge" my remarks as lend them force. She apparently accepts the opinion that there is too much wrongly timed and wrongly arranged interference with mother and baby in hospitals, and probably quite rightly puts this down to the exigencies of institutional treatment in general; but she feels that all this is different in the patient's own home. Yet at the beginning of her letter she writes: "Even if, as he says, the modern nurse takes full command of her patient's baby, it is surely a sign that there is something wrong with the system," etc.—and that is precisely what I was trying to make clear.

Her happy picture of how things go in a confinement at home does fit in often with puerperia where the district nurse comes in once a day, but even then the woman is often upset by the cares of an inadequately staffed household. When, however, the household is taken off her hands, then it is usually the case that she has a resident nurse all to herself; and it is those people that I had particularly in mind when I wrote my letter. Why on earth in such cases, where there is the whole twenty-four hours of the day available, should, for instance, a poor woman be awakened before daylight, made to use a bed-pan, fussed over and bullied, and then be expected quietly to provide milk for her infant? It is psychologically wrong, but is only one example of nursing obtuseness.—I am, etc.,

December 2. JUVENIS.

Air Raid Precautions

SIR,—A study of the numerous letters on air raid precautions published in the *Journal* since the crisis shows that the writers are, almost without exception, gravely concerned at the almost complete lack of bomb-proof aid posts, casualty clearing stations, and civilian shelters in our cities.

That other countries are less backward in these respects was clearly shown during the debate on medical services in civil defence in the House of Commons on November 30, in the course of which Mr. Oliver Simmonds, M.P. for the Duddeston Division of Birmingham, who is also chairman of the Parliamentary Air Raid Precautions Committee, stated that he had recently had the opportunity of investigating medical defence arrangements in Paris, and had found that, even before the crisis occurred, in over thirty of the districts large underground casualty clearing stations had been constructed, each from 8,000 to 12,000 square feet in area, and each proof against a direct hit from high-explosive bombs up to 200 lb. and in many cases up to 500 lb. These hospitals contain about 200 beds each, and are so equipped that they can absorb sixty cases an hour and can supply all facilities for carrying out urgent operations on the wounded even during continuous air raids. Mr. Simmonds, after studying the question in France, Germany, and also under action in Spain, considered that no great surface hospital in a large city in this country would be able to carry on for more than a day or two after the outbreak of war. He added that it was a fantastic proposition to expect medical services to operate with even a fair degree of success in the centre of highly vulnerable and congested areas.

The seriousness of the picture which Mr. Simmonds drew will no doubt come as a surprise to some, but to those who have thought much about the question, and who have had experience of mass bombardment, his conclusions will not seem in any way exaggerated. To have such underground casualty clearing stations ready equipped at all times, situated in easily accessible areas in every district, and with medical and nursing staffs properly allocated, as is the case in Paris, would add very greatly to the sense of security of the civilian population. They would then realize, as did our troops in the last war, that all possible medical precautions were being taken for their safety. These bomb-proof hospitals would enable the medical organizations to give continuous service during incessant air raids, even if surface hospitals were being put out of action one after another.

In addition to the above it is essential that bomb-proof shelters for the civilian population should be provided on a large scale in all towns, for in no other way can the number of probable casualties be kept within manageable limits. If shelters and hospitals were built as we have suggested they would provide for many years to come an excellent insurance against aerial attack, and such a result is worth far more than any expense likely to be incurred in their construction. What has been done in Paris can be done in British cities, and if it is to be done it must be done quickly, for every day is precious.

It is earnestly to be hoped that the full weight of medical opinion will be used to emphasize the immediate importance of these plans.—We are, etc.,

R. OGIER WARD.
CLEMENT FRANCIS.

London, W.1, Dec. 12.

SIR,—While supporting strongly Major W. V. Fawkner-Corbett's suggestion (*Journal*, November 26, p. 1114) of a full staff for medical A.R.P. work, may I protest even

more strongly against his obvious but dangerous suggestion that the nucleus for this staff could be provided by the county and borough officials; and this on many grounds.

First of all, county medical officers are—or should be—already fully occupied with their normal jobs. Only a few months ago a county M.O.H. wrote to me that he was busily engaged on twenty big county schemes, of which, presumably, A.R.P. was one. In such conditions it is inevitable that a large part of the work gets done by others, usually hard-working and well-meaning clerks. The natural result is inefficiency, irritation, and extravagance. It certainly was so with A.R.P. during the crisis, and for some while to come A.R.P. work is large and important enough to demand the whole energies of the best men who can be found for the job. If it is to be efficient it cannot be standardized all over the country, for the requirements of each area differ greatly according to geographical, social, and industrial circumstances.

Secondly, county boundaries are the most curious things in the world, and if an A.R.P. scheme is to be efficiently and economically run it should be grouped according to areas of population and not municipal or county areas.

Thirdly, public health work does not demand nor develop those qualities which are required in emergencies such as air raids are likely to present. Incidentally these are likely to present such urgent and unforeseen problems of pure public health that public health officers will be more than occupied in their own departments, with no time to spare for the actual A.R.P. medical work itself. Though I think it is important that leaders in A.R.P. work should have sympathy and understanding of the problems of public health work, I think it is even more important that they should not be recruited from actual members of the public health services.

Finally, one must try to envisage the condition of affairs at the end of the struggle. If the heads of A.R.P. during wartime are to be existing public health officials, the only outcome I can see is a profession completely absorbed in the Government machine. Whether this should be regarded as a good or a bad thing I do not pretend to discuss here, but the issue is certainly involved in the organization which is to be built up in the next few weeks or months. I sincerely hope that other members of the profession will make known their opinions on the matter, and that the B.M.A. will take some really effective action to see that we do not become enslaved through our patriotic efforts to work in with Government plans.—I am, etc.,

Winsford, Cheshire, Nov. 28. W. N. LEAK.

SIR,—Surely it has now become quite clear that, if war should occur, life in our big cities will only be possible in bomb-proof dug-outs of the type of the Maginot or Siegfried Lines. This means almost wholesale evacuation, since few people will be prepared to live under such conditions. At present we still talk of evacuation taking place "in the event of war," but presently all will realize that anything like orderly large-scale evacuation of cities when war breaks out would be quite impracticable, and that the evacuation will have to be begun now, while there is at least comparative peace. Further, the idea of billeting will have to be given up. The next war will not be a mere passing phase, but will mean practically the end of our great cities as we now know them. Also, the supply of food from abroad will be largely cut off. If our people are to keep alive at all—I mean such of them as escape destruction in the cities—they will mostly have to be settled on the land and trained to agriculture; there they will have to raise food, and not primarily for marketing but for the subsistence of themselves, their families, and their neighbours.

It may be said that this is a terrible come-down for civilization. I think, however, that we have here simply a case of the working out of Nature's laws. After all, why should there not be laws of social happenings as well as of physiological and psychological? Apparently our whole hyperurbanized Western civilization has been for a long time increasingly flouting Nature; it has become entirely unnatural, artificial. War, therefore, means the destruction of radically unhealthy tissue, and that is what our great cities have become.

This was what I meant to say when, in another connexion, I raised the problem of "social pathology." Let us face the facts, and in no circumstances fail to take warning from Nature's danger-signal. The rural–urban balance in our civilization has become profoundly upset, and must be straightway redressed or complete disaster will overtake us. Let a well-thought-out and resolute back-to-the-land scheme therefore be entered upon forthwith. And in this good work the medical above all professions should lead, not be led.—I am, etc.,

North Queensferry, Fife, Dec. 5. A. J. BROCK.

SIR,—The letters in your columns upon air raid precautions, written by men who, as regimental medical officers in war, had a close acquaintance with high explosive and its horrors, deserve a wider publicity than the *Journal*. Unfortunately the British public is lulled to believe that with a multiplicity of gas masks, first-aid lectures, and air raid wardens all is well. They have yet to realize that a yard of efficient bomb-proof shelter is worth more than the ministrations of dozens of doctors to the victim caught in the open by an enemy bomber. Limitation of casualties should be the first objective. Evacuation of population may be impracticable. Underground bomb-proof shelters are essential in all towns.

It would be interesting to know if the present heads of the Home Office and the Ministry of Health have any personal experience of bombardment—the only experience, I think, that can help to visualize a future inferno. Herr Hitler, being in the "forties," has that experience, and is in consequence a true believer in concrete. My friend Dr. F. G. Chandler, as I knew him in 1914, before we both became M.O.s to Highland battalions, was far from being a "yes-man," and I welcomed his letter in the *Journal* of December 3 (p. 1175). He has the courage and perseverance which may yet, in spite of obstruction, get things done. If he fails, then, as bombs fall upon an undefended St. Bartholomew's, he will, I know, be much consoled by the thought that at the House of Commons they have their vaults and underground passages.—I am, etc.,

D. W. PAILTHORPE,
Alresford, Hants, Dec. 6. Major R.A.M.C. (ret.).

SIR,—There can be no question that if a modern bombing of London ever takes place it will be utterly impossible for students to continue their studies unless there are adequate bomb-proof shelters. These are the urgent requirement. They should be begun and made at once, not after months or years of argument. No other devices are likely to be of such use. Trenches are a good beginning, but not enough. The schemes for evacuating children and others to distant outlying places are more or less futile. Of course, if several days' notice is to be given there may be something in it, but no such notice is expected to be given. Surprise is to be the essence of the attack, and the arrival of bombing planes

is more likely to be a matter of minutes even than of hours, let alone days. In such an event the massing of crowds making for railway stations or other exits would provide just the targets bombers would desire. Therefore urge the authorities to construct bomb-proof shelters at once, either above or below ground. These are by far the most urgently required means of protection for the populace.—I am, etc.,

G. F. ROWCROFT,
Colonel.

Coonoor, S. India, Nov. 30.

The Refugee Problem

SIR,—I should be grateful if you would allow me through your columns to draw the attention of your readers to the special contribution which the Society for the Protection of Science and Learning is making, and has been making over the past five years, to the refugee problem, which the whole of the civilized world is to-day facing with such remarkable spontaneity and generosity.

This Society (of which His Grace the Archbishop of York is president and Sir Frederic Kenyon chairman) exists to help scholars and scientists displaced from their own universities and professions to be reabsorbed into academic life elsewhere, so that their intellectual gifts and training may not be wasted and so that each individual scientist, scholar, and doctor may still be able to make the contribution to knowledge which in many cases he and he alone is capable of making. So far we have succeeded in placing over 500 permanently and nearly 350 temporarily, and among those whom we have been privileged to help are men and women whose intellectual gifts and genius form part of the cultural wealth of the world.

The Society for the Protection of Science and Learning is not concerned at any time with the problem of those practising medical men who seek to come to Britain from countries where they are no longer able to receive patients. Its activities cover only those doctors whose research work has been interrupted in their own land and whose work is of such importance that our Medical Advisory Subcommittee considers that it should be carried on in this country. Needless to say, of very many applications in this class we are, at present, only able to give grants to a small proportion.

The Society is holding a number of meetings early in February in the academic centres throughout the country to enable all those engaged in teaching, learning, and research to give corporate and tangible expression to their sympathy. I hope these meetings will have the most generous possible support, as the latest developments in Germany, the crisis in Czecho-Slovakia, and the new legislation in Italy have trebled our waiting lists and made each individual problem more pressing and acute. As vice-president of the Society I should be grateful if you would publish this letter so that this part of the work undertaken to help these distinguished refugees and exiles of learning may be widely known.—I am, etc.,

W. H. BEVERIDGE.

6, Gordon Square, W.C.1, Dec. 8.

*** The Society for the Protection of Science and Learning (formerly the Academic Assistance Council) seeks to help medical research scientists whose work has been interrupted in their own country for reasons of race, religion, or politics. It does not, however, deal at all with practising doctors, as such, who are the care of another committee, presided over by Dr. Robert Hutchison. It considers making grants towards the re-establishment in academic life of medical scientists who undertake that they will not seek to practise and who are recommended highly by a specially constituted Advisory Subcommittee, as follows: Professor A. V. Hill, Sec. R.S., Professor C. S. Gibson, F.R.S., Professor M. Greenwood, F.R.S., Professor B. A. McSwiney, Professor G. Payling Wright, Dr. George Pickering, Dr. D'Arcy Hart, and Dr. D. N. Nabarro. Among the members of the Society's committee which is seeking to increase the funds available for this work are: Dr. Robert Hutchison, P.R.C.P., Mr. Hugh Lett, P.R.C.S., and Sir Cuthbert Wallace, while Sir Farquhar Buzzard is a member of the Society's Council.—ED., *B.M.J.*

What is Accredited Milk?

SIR,—I have read the article "Raw and Pasteurized Milk" (November 19, p. 1049), in which you say "examination of the raw milk showed that 30 per cent. of samples contained tubercle bacilli, in spite of the fact that it came mainly from accredited herds." I am interested to note that you suppose that "accredited" herds should produce milk which is freer from tubercle bacilli than milk from non-accredited herds, because the certificate for "accredited" milk is granted purely on the cleanliness of the cowsheds, utensils, and milk itself, but with no tubercle testing of the individual cows or of the milk itself. It must therefore be obvious that the condemnation of "accredited" milk in containing tubercle bacilli should have no connexion, such as is implied in your article, with non-pasteurized milk from tuberculin-tested herds. I maintain that if the test were carried out on such milk, then a very much lower percentage of samples would be found to contain tubercle bacilli; and if this is so your confusion between the terms "accredited" and "tuberculin tested" has created a grossly mistaken impression. I write this as a layman, but as (I hope) an intelligent and progressive milk producer-retailer.—I am, etc.,

WM. H. CHAPLIN.

Stebbing, near Chelmsford, Nov. 30.

*** The certificate for "accredited milk" is given not purely on cleanliness but on the veterinary examination of the cows. Under the Milk (Special Designations) Order, 1936, every milch cow belonging to an "accredited" herd must be submitted to an examination by a veterinary surgeon once in every three months, and any animal found to be suffering from a disease that is likely to affect the milk injuriously must be segregated or removed from the herd. The purpose of this injunction is clearly to ensure so far as possible by clinical examination that no cow with tuberculosis or other serious disease of the udder shall be allowed to contribute its milk to that of the herd. If clinical examination is of value in the early detection of udder tuberculosis, as many veterinarians believe, then milk from "accredited" herds should, on the average, be less frequently infected with tubercle bacilli than milk from ordinary herds. The fact that 30 per cent. of milk coming mainly from "accredited" herds was found at Reading to contain tubercle bacilli raises a question as to the efficacy of clinical veterinary examination in protecting the milk supply from tuberculous infection.—ED., *B.M.J.*

Did Columbus Discover Syphilis?

SIR,—With reference to the annotation in the *Journal* of December 3 (p. 1153), syphilis was no doubt known among the Indians of Peru, under the Incas, before the arrival of the Spaniards. I was employed as medical officer to some isolated mines in Chili, fifty miles from the

coast, from 1882 to 1886, in which period no case of syphilis, congenital or acquired, was brought to me for treatment. Discussing this freedom with reliable men I was informed that Peruvian skulls existed with evidence of syphilitic damage, and, moreover, that the Inca overseers knew that mercury was curative. Sufferers from this disease were sent to work in the cinnabar mines, where this sulphide of mercury dust falling on the bare sweating skin no doubt produced early absorption. The name Chili so closely resembles place names in China that it is reasonable to suggest that the disease might have originated from some sailors on a Chinese junk. Indeed, the slang term for a prostitute was *una Chinita*.—I am, etc.,

Merionethshire, Dec. 5. ARTHUR GRAYLING.

Medico-Legal

THE CROYDON TYPHOID LAWSUIT

A TEST ACTION

The epidemic of typhoid which broke out in Croydon in the autumn of 1937 caused forty-three deaths and attacked, in all, 341 persons. The findings of the inquiry which was held to investigate the disaster attached a substantial amount of blame to the county borough authority. Many of the persons who suffered made claims against the corporation, and one of these claims was selected by consent as the foundation of a test action, the findings of fact and law in which should, so far as they were applicable, decide the other claims.

The Case of Miss Read

One of the patients was a girl of 15 named Patricia Rosemary Read, and she and her father sued the council for damages sustained through her illness. Her father claimed special damages for the expense of her medical treatment, nursing, and other items, and she claimed general damages for pain, suffering, and inconvenience. The grounds of the action were fourfold: (1) breach of contract for the sale of goods, in which, in accordance with the Sale of Goods Act, 1893, Sect. 14, the corporation had warranted the purity of the water it supplied to a ratepayer; (2) breach of contract to render services, with a similar warranty; (3) breach of its statutory duty under the Waterworks Clauses Act, 1847, Sect. 35, to provide and keep in their pipes a supply of pure and wholesome water sufficient for the domestic use of the inhabitants of the borough; under the Public Health Act, 1936, Sect. 115, to secure that the water which they supplied for domestic purposes was wholesome; and under Sect. 111 of the same Act, to take from time to time the necessary steps to ascertain that its water supplies were sufficient and wholesome; and (4) common law negligence—that is, breach of a duty to use a requisite degree of care or skill in supplying to Mr. Read's house water which the corporation knew that he and the members of his household would drink.

The Addington Well

The hearing took place before Mr. Justice Stable in the middle of last month. A large volume of evidence was called, and brought out substantially the same facts as were elicited at the inquiry.* The corporation were generous in their admission of documents. The system through which the infection was spread is called the "high level" system, and is fed from the Addington reservoir. This is fed from the Stroud Green well and the Addington well. There was no real doubt that the infection came from the Addington well. This is sunk in the chalk and has a number of adits—horizontal tunnels driven out in various directions near the bottom to collect water from the surrounding earth. It is supplied from a gathering-ground immediately to the south, and this, although it contains a number of possible sources of contamination, was not seriously incriminated. Its nature had, however, this importance in the case: that the risk of contamination from certain places in it, such as cesspools and a pig farm, was serious enough to throw on the corporation a duty of exercising considerable vigilance. The records of the corporation show that the Addington supply had for at least thirty years been under some measure of suspicion, and that the corporation had taken steps to improve the gathering-ground, had installed an ozone plant in 1908, a high-pressure plant and chlorinating plant in 1928, and ammoniating plant in 1936. In 1937 it spent a large sum in acquiring land to protect the gathering-ground. The water is pumped from the well to a high-pressure filtering station, then to the chlorinating plant, then to a filtered-water tank, and then to the Addington reservoir. The surroundings of this reservoir were at one time suspected, but the corporation took appropriate steps to protect the water, and there was no evidence that infection entered at that point.

For a considerable time before the epidemic broke out the water was analysed once a month. Samples were taken both from the well and from the reservoir: the former to show what precautions ought to be taken to make the well-water fit for human consumption, the latter to show whether those precautions had been effective. At the end of September, 1937, the corporation started work on the well. A depression had appeared in the floor of one of the adits and silt had collected; it was therefore desirable to cut a tunnel from this depression to one of the adits at a lower level. While the work was going on the water from the well was pumped to waste, and after the workmen stopped work in the evening about half an hour was allowed for any disturbance to subside and then water was again pumped to supply. This operation was finished on October 16, but another had immediately to be undertaken. One of the two pumps had broken down, and it became necessary to brick up two of the adits in order to prevent the well from receiving more water than the remaining pump could deal with. During this vital period, from October 16 to November 3, the whole of the water was pumped to supply whether the men were working in the well or not.

Eighteen workmen were employed, each of whom had worked for the corporation before, but none had been medically examined. They had been instructed to be careful to use the lavatories provided on the surface immediately before they went down to work. A man who wished to relieve himself was required to come to the surface to do so, but on a few occasions an open bucket was let down to allow a workman to urinate. One workman, who was called throughout the proceedings "Case A," had been in the employment of the corporation since 1921, and had seemed a perfectly fit and proper person to work in close proximity to the water supply. He had, however, suffered in the war from typhoid fever and was a carrier.

The history of the precautions taken by the corporation showed that in May, 1936, the medical officer of health received an analysis of the Addington water which showed the presence of *Bacillus coli*. He formed the opinion that the water was not adequately filtered. The borough engineer pointed out that a chlorinating plant was installed, and that, if the medical officer considered it should be used, that would be done, but he thought that it would be better to avoid using it if possible. On July 18, 1936, the chief water assistant—the officer responsible for water supplies—sent a memorandum to the borough engineer containing these words: "I would like to put on record that I have for the last two months been of the opinion that chlorination should be in regular use in view of the analyses received." This memorandum indicated, as the learned judge pointed out, that despite the apprehension expressed by the medical officer of

* The proceedings at the public inquiry were recorded in the *British Medical Journal* of December 11 and 25, 1937; January 1, 8, 15, and 22, 1938; and the report by Mr. H. L. Murphy, K.C., on February 19.

health in May and the opinion formed by the chief water assistant no steps had been taken to chlorinate the water. On July 20 chlorination was started, but no log of its use was kept. It seemed to have been used as a remedy for a varying impurity in the supplies, and to have been increased when the analyses showed a deterioration, and to meet a sudden emergency such as the death of a workman in the well at the end of 1936. At the end of October, 1936, an analysis showed a great increase of *B. coli*—a report which, incidentally, did not come to the notice of the chief water assistant for a fortnight. On November 13 this officer directed his subordinates to increase the rate of chlorination until further notice. At the end of April, 1937, for no reason that appeared at the trial and presumably by a mere oversight, the practice of taking an analysis of the raw water at the Addington well was abandoned. Neither the chief water assistant, the borough engineer, the water committee, nor anyone else so much as noticed that this precaution had been allowed to drop. On September 17, 1937, a week before the work on the well began, the practice of filtering and chlorinating the water was wholly abandoned, and it was not resumed during the entire time that the workmen were working down the well. On November 1, by which time the authorities knew of the epidemic, heavy chlorination was applied and—a fact which the judge regarded as significant—no more primary cases occurred after November 4.

Attitude of the Corporation

The learned judge drew special attention to what he called the wholly commendable attitude of the corporation towards the action. Instead of adopting a defensive and obstructive position, and leaving the plaintiffs to ferret out and prove as much or as little of the material facts as they could, the corporation made the fullest and most candid admission of all the material facts it could ascertain. When its officers knew that there was an outbreak of typhoid they made every effort to discover the origin and to expose any weakness in the system of administration, regardless of the consequences which their investigation might have for the persons who might be responsible and on whose sense of public duty the success or failure of the investigation largely depended. In making an investigation, which proved to be the instrument which brought the onslaught of the epidemic to a standstill in its very early stages, the officers of the corporation subordinated every consideration of private interest to the paramount necessity of finding out the truth. His Lordship had no doubt that the action of the corporation more than restored any loss of confidence the public might have experienced in its administration of these important health services. Mr. H. J. Wallington, K.C., who appeared for Mr. Read and his daughter, particularly commended the report of the medical officer of health, Dr. O. M. Holden. This, he said, was a very frank account, which sought to conceal nothing. The judge remarked that he was struck by the extraordinary candour which the medical officer seemed to have displayed, and by his disinterested pursuit of the truth, no matter where it led. Counsel agreed that his candour "jumped out of" every line of the report, and said that such considerations made him regret to have to make such a charge against persons of that type.

The Judgment

The hearing of the case occupied eight days, and Mr. Justice Stable reserved his judgment. Delivering it on December 2, he said that the evidence conclusively established that the corporation had been guilty of negligence, not merely of a failure to carry out a duty imposed by statute, but a lack of that care and skill which were to be attributed to a body which had undertaken to supply water to such a community. All the officers were men qualified for their work, and he found no trace anywhere of that degree of negligence which, arising either from indifference, inefficiency, or lack of a sense of responsibility, would amount to a deliberate dereliction of duty. The chief water assistant, who on October 14 had left the service of the Croydon Corporation to enter that of the Brighton Corporation—just before the end of the first operation on the well and the beginning of the second—was fully qualified and a public servant of integrity, and nothing emerged from the evidence to diminish the confidence which his present employers reposed in him. He was very largely a victim of the imperfect and inadequate system of control in force. On his departure the senior officer directly in charge of the work had given instructions, which he honestly believed to be in accordance with the wishes of higher authority, that on and after October 16 the water should be pumped direct to supply. His Lordship formed a favourable opinion of this officer, but declared that so vital a decision ought not to have been left to a man in his position, and condemned a lack of system under which it could have been taken without at once being brought to the notice of the persons at the head of the chain of responsibility.

Sir Walter Monckton, K.C., who appeared for the defence, had argued that the possibility of the contamination was so remote that no one was to blame for not foreseeing it, and had stressed the danger of wisdom after the event. The learned judge said that in forming his conclusions he had been on his guard to measure the care and skill that were required, not in the light of what was known in October, 1938, but in the light of the experience of the men on the spot in the autumn of 1937. In his judgment the evidence conclusively proved that the epidemic was caused either by an infection brought into the water by the workman who was a carrier of typhoid, or by some unidentified and probably transitory condition in the gathering-ground. The defence had suggested the bare possibility that infection from the excrement of some passer-by had been washed down from the gathering-ground to the well. That this should have happened at the same time as a carrier of typhoid was working in the well extended, he said, the well-nigh limitless possibilities of coincidence almost to infinity. Moreover, whichever had been the origin of the infection, the consequences would have been avoided if proper use had been made of the available protective apparatus.

RESPONSIBILITY FOR WATER SUPPLY

He did not find substance in the criticisms which had been levelled against the sanitary arrangements made for the workmen at the well. He was satisfied that the responsible officers had provided a proper solution of this problem. He found no greater substance in the criticism directed against the absence of a medical examination of the workmen, the method of their selection for the work, and their supervision when at work. With all the wealth of expert testimony which the plaintiffs had at their command, they could only establish a solitary instance, at Caterham in 1879, of an epidemic of typhoid being caused by a carrier. Due care and skill had been taken in the selection of the men, and he was satisfied that the superiors under whose supervision they were working were conscientious, responsible, and trustworthy.

While the probabilities (continued his Lordship), estimated immediately before the outbreak, that the water could be infected by Case A were utterly remote, yet the bacteriologist or water engineer responsible for the supply of water to an urban community must be constantly on his guard against innumerable risks. Though the chance of any one of the risks materializing into a peril was remote, collectively and in the aggregate the danger was real and substantial. In his judgment the corporation had failed in its duty in two major respects. From July, 1936, when the chlorinating plant first came into use, the extent to which this precaution was enforced was haphazard, ill-considered, and inadequate. The decision at the moment of greatest peril, when the water was being put into supply and while the men were working in the well, to omit the customary precaution of filtration and chlorination was, even regarded in the light of what was known then, inexcusable. He would not apportion responsibility among individuals; *prima facie* it must rest on the shoulders of the water committee, to whom was entrusted the general superintendence of the water supply. No evidence had been adduced to show that any one member of that committee made any inquiry or took any step whatever to

formulate any established policy in connexion with chlorination, or to set up machinery to put that policy into effect, or to provide a proper system of supervision and inspection to secure that any policy which was adopted was being efficiently, regularly, and systematically carried out. In these circumstances, where the responsibility *prima facie* rested there he proposed to let it lie.

His Lordship continued: "Sir Walter Monckton further urged, and again with great force, that the policy of chlorination in connexion with chalk wells was of comparatively recent origin and was by no means universally liked. The trouble in this case, in my judgment, largely originated from the fact that on this all-important question there never was a settled policy at all. While I have absolved the corporation and its servants from every charge of negligence brought in connexion with the gathering-ground and the selection and supervision of its workmen, and the conditions under which they worked, these facts cannot be segregated from the other established facts in this case. If some paramount and overriding necessity existed—and I find that there was no such necessity—which demanded that water should be pumped in its crude state straight to supply while work was in progress in the well, then the additional risk to the health of the people of Croydon which was thus inevitably created ought to have been counteracted by additional precautions designed to obviate the possibility of infection being introduced into the water by the close proximity of the workmen. These precautions, which might have taken the form of continual analysis, searching inquiry into the antecedents of the men engaged on the work, and incessant supervision while they were so employed, were not taken. No one made it his duty to inquire whether or not they were taken, or to see that the precautions, if they had been adopted, were observed. The system in this respect proved itself inadequate to support the very heavy burden of responsibility which it had to carry."

THE CORPORATION'S STATUTORY OBLIGATION

On the questions of law involved, the learned judge held that there had been no contract between the corporation and Mr. Read. By the Waterworks Clauses Act, 1847, the corporation, having undertaken to supply water to the inhabitants of the borough, was under a statutory obligation to provide and keep in its pipes a supply of pure and wholesome water sufficient for the domestic use of those inhabitants who fell within a certain category—namely, owners and occupiers of dwelling-houses who had laid the necessary communication pipes and paid or tendered the water rate, and were therefore entitled to demand and receive a sufficient supply. Although rights and obligations under this relationship might be similar to, or identical with, rights created by a contract, the relationship was not a contractual one. Concerning the scope of the statutory duty, he said that Mr. Read fell into the category of persons to whom this duty was owed by the corporation, but his daughter did not.

His Lordship then considered in detail the question of whether or not the duty to provide and keep a supply of pure and wholesome water was an absolute one—that is, whether the corporation could be penalized for breaking it even though they might not have been negligent. After considering many authorities he held that the obligation was limited to the exercise of all reasonable care and skill to ensure that the water was pure and wholesome. He had no doubt that the standard of care and skill in a matter so vital to the public health was a high one, but if that standard was maintained he did not think that the corporation could be held liable for the consequence of some impurity which no care or skill could have prevented. He had, however, found as a fact that the corporation had not used a requisite degree of care and skill.

It had also been argued before him that existence of the statutory duty excluded a duty at common law, and that Miss Read could not recover damages because the corporation owed her no statutory duty. If this view of the law were right, he said, the consequences were startling. The corporation were obliged to supply water sufficient for the domestic needs of ratepayers. This meant a supply sufficient not merely for the ratepayers themselves but also for their families and households. It must have been within the contemplation of everybody who gave the matter a thought that the water so supplied would be consumed by persons outside the very limited class to which the duty was owed. Miss Read had contracted a dangerous illness as a direct result of the corporation's negligence. In the present case, the judge continued, a complete cause of action could be set out without mentioning the statute at all. If the corporation supplied to Mr. Read's house water for drinking purposes which it knew he and his household would consume, and failed to exercise the requisite degree of skill and care in that operation, with the result that what it supplied was not drinking-water but poison, a person injured would have a complete cause of action at common law for the damage sustained as the result of that negligence. He awarded an agreed sum of special damages to Mr. Read, and £100 general damages to his daughter.

The Corporation and Other Claims

The corporation has announced that it will not appeal against this decision, and it will deal with the 230 or so other claims against it as quickly as possible. The Finance Committee is anxious that proper compensation shall be paid in other cases where the issues are the same as those of the test action. Until the terms of settlement have been agreed no definite estimate can be given of the cost to the rates. The corporation proposes to raise a loan over a period of twenty years. A total cost of £100,000 would represent an increase in the rates of three-farthings in the pound for twenty years.

MENTAL PATIENTS IN AN UNLICENSED HOUSE

For the protection of persons of unsound mind, Parliament laid down in the Lunacy and Mental Treatment Acts, 1890–1930, that no person of unsound mind might be received or detained, or taken charge of for payment, in a house not licensed for the purpose by the Board of Control. Prosecutions for these offences are rare, and a case heard by the Bournemouth magistrates at the end of November* is of special interest.

Dr. X was summoned on three charges: taking charge of a person of unsound mind in an unlicensed house, receiving another person of unsound mind to board and lodge him, and detaining a person of unsound mind, all between September 8 and October 15 of this year. He pleaded not guilty. An officer of the Board of Control said that the house was not licensed and that some time ago the doctor's attention had been called to the provisions of the Lunacy Act. The patients in question were two women and a man. The wife of the man, giving evidence, said he had a stroke in November, 1937, and was admitted to the house in July, 1938, under the care of Dr. X, who agreed to take charge of him at a weekly rate, which she had paid from time to time to Mrs. X. The sister of one of the women patients said that Dr. X came to the house where they were living and took the patient to the home. In paying for her sister's presence there she had made the cheque out to Dr. X. She had learned a few days ago that it was Mrs. X's nursing home. A managing clerk of the solicitors who represented the relatives of the third patient said that from January, 1934, to the end of 1935 payments were made to Dr. X, but from the beginning of 1936 Mrs. X had taken over and all payments since then had been made to her. From then she had known that it was Mrs. X's nursing home. The medical superintendent of the Dorchester County Hospital and the medical superintendent of the Knowle Mental Hospital, Fareham, gave evidence that they had inspected the three patients and found them certifiable as of unsound mind. A police detective said that he had visited the house and that the defendant had said that the patients were not his and had their own doctors.

Mr. James Amphlett, counsel, instructed by Messrs. Le Brasseur and Oakley on behalf of the London and Counties

* *Bournemouth Daily Echo*, November 25, 1938.

Medical Protection Society, said that the defence maintained that the home did not belong to Dr. X and that he had nothing to do with the patients; moreover, they were not of unsound mind. The defendant, giving evidence, said that in 1932 he had run a private hotel, which was unsuccessful, and after closing it he had had a bad nervous breakdown. In 1936 he had become a bankrupt and was still undischarged. One of the patients had been sent by a doctor in 1933. She suffered from cerebral thrombosis, and he saw in her not the slightest sign of insanity. In June this year his wife took the house and she and he had both signed the lease, he at the landlord's request. He spent about four months of the year in bed; he practised as a neurologist and his wife ran the nursing home. He had never run it, and to anyone who came to the door he made very plain that he did not run it. If treatment were required for the patients, Mrs. X received instructions from their doctors and not from him. He never saw any sign of insanity in any of the three patients, and they were not of unsound mind. Cross-examined, he said that he was helping his wife to some extent to run the home, but only on the business side.

Mrs. X said she was a fully trained nurse and the proprietress of the home. Her husband was only her adviser. Two general practitioners of Bournemouth both testified that the three patients were not insane. The first practitioner said that one of the women had cerebral thrombosis and he had asked Dr. X to take her into his previous home at Chine Crescent Road, where he had been living in 1933. She was not insane, of unsound mind, or an idiot. He had seen her later in September of this year and found her normal. The home had proved most useful for senile patients who were not certifiable. The second practitioner said that the other woman was not a lunatic, and that the man had been his patient for twenty-six years, during the whole of which period his mental condition had been absolutely sound.

The Bench found all three charges proved and imposed a fine of £15 for each, with £15 costs.

The heading to a paragraph in this column last week (p. 1231) may have given the impression to a casual reader that pentothal was held to be the single cause of the patient's death. The pathological evidence (briefly summarized in the report indicated two other contributory causes, and the coroner's verdict was "Death from misadventure."

Mr. Justice Croom-Johnson proposed the toast of "Medicine" at a dinner of the Manchester and District Medico-Legal Society on December 8. He is reported in the *Manchester Guardian* to have said that the realm which lay between the punitive and medical treatments of crime had been inadequately explored. He had been struck by the large number of occasions on which he was called upon to punish people when, in fact, they ought to be the subject of clinical examination and medical treatment. He did not wish to be misunderstood. There was abroad a feeling that the criminal should be better treated. In his judgment a danger existed that, by over-sentimental treatment of the criminal, the administration of law and order might be made extremely difficult for those who had the grave task to fulfil. "But we all feel, as we deal with case after case (especially those who come from our large centres of civilization), that a great deal more might be done in examining cases from the medical aspect." Judge Leigh, the president, said that the society had achieved a membership of more than two hundred in two years, and was helping its two constituent bodies to understand each other better.

The issue of the *Journal of Pediatrics* for November is devoted to the memory of Dr. Williams McKim Marriott (1885–1936), professor of research medicine at the University of California Medical School, and contains a bibliography of his writings and his portrait.

Medical Notes in Parliament

In the House of Lords on December 12 the Housing (Financial Provisions) (Scotland) Bill was read a second time.

In the House of Commons second readings were given to the Cancer Bill on December 12 and to the Reorganization of Offices (Scotland) Bill on December 13.

Dr. Walter Elliot dined with the Parliamentary Medical Committee on December 14.

Cancer Bill

In the House of Commons on December 12 Dr. ELLIOT moved the second reading of the Cancer Bill. He said that no one could deny the urgent necessity for some means of bringing adequate facilities for the treatment of cancer within the range of everyone. Although there was an obvious field for increased research into prevention and causation of cancer, in the past years substantial progress in this direction had been made. Records made by surgeons of the histories of the patients on whom they had operated had shown that patients with cancer could be freed from their disease. Radium had been found to have a definite action on cancer cells which led either to their destruction or to some change which facilitated their removal by healthy tissues. *X* rays had a similar effect. There seemed to be a belief that in certain conditions they produced even better results.

For these forms of treatment to be successful, however, they must be employed when the disease was at an early stage. There must, therefore, be ample facilities for early diagnosis and adequate treatment, both of which were at present lacking in this country. For many other diseases it was easy for patients, no matter in what remote part of the country they lived, to receive modern and adequate treatment, and, as a result, mortality from these diseases had fallen. He was hopeful that the powers which the Bill conferred would in time achieve sensible results with this terrible scourge, but they must be careful not to underrate the size of the problem.

SOME STATISTICS OF CANCER

Cancer had now become the second on the list of fatal diseases in this country. The annual number of deaths from this disease had been steadily mounting, and the total for Great Britain in 1937 was 74,000. Of the total deaths from all causes during the working period of life (15–65), 17 per cent. were due to cancer; nearly half the deaths (48 per cent.) occurred under the age of 65, while about 10,000 occurred under the age of 50, when working or business capacity was at its fullest and when the heads of families were most necessary to their children. The annual death rate for cancer per million of the population in Great Britain was 835 for 1901 and 1,624 in 1937. Thus the rate had nearly doubled in the course of a generation. That increase was in striking contrast to other diseases, where there had been and still was a steady fall, and meant that over 6,000 persons had died of cancer since the King's Speech on November 9.

All other countries which had registration systems manifested an upward trend. While in Great Britain the percentage increase in the death rate between the quinquennial period 1926–30 and the present day was 14 per cent., in Holland the percentage increase for the same period was 9.5 per cent., in Switzerland 3.7 per cent., and in France 3.9 per cent. These countries appeared statistically to have lower rates than our own, but it was impossible, for technical reasons, to be sure that they had less cancer than we had. Among primitive and native races cancer was by no means unknown, and in some of them there were forms of cancer which were more common than among ourselves. It was not possible, of course, to arrive at comparable mortality figures for these peoples.

There had been much discussion and investigation intended to ascertain whether the increasing number of deaths meant a real increase of cancer. The general opinion seemed to be that much of the increase was readily explicable in other ways, such as increased longevity, more accurate diagnosis, and so forth. In cancer of certain of the more accessible organs the

mortality was declining at almost every age—for example, in cancer of the lip, jaw, and skin. It was probable that this decline was due, at all events in part, to the effect of treatment. Some of the decline, on the other hand, was probably due to a lower incidence in these organs. But there was an increasing incidence for some organs. Certain forms of cancer were disappearing altogether. Cancer of the skin caused by undue exposure to *x* rays was, we might hope, a thing of the past. Other skin cancers due to exposure to tar, mineral oil, soot, etc., were to a large extent preventable, partly by avoidance of exposure, partly by preventive treatment of those conditions of the skin which preceded the actual cancer. It was probable, too, that some of our health services—for dental care, for the treatment of venereal disease, and for maternal care—contributed to prevention of diseased conditions which might progress to cancer.

From various inquiries conducted by the Ministry it had been estimated roughly that there were over 100,000 persons in the United Kingdom suffering from cancer during 1937. Of these about 10 per cent. were affected with the disease in organs for which treatment had not hitherto been practicable. A further 50 per cent. were susceptible at present to treatment by surgery alone, but only if their disease was diagnosed at an early stage. If the cancer had progressed too far for such treatment little could be done for these patients. In this group were included cancers of the stomach and intestine, which, taken as a whole, accounted for the largest number of deaths. There remained about 40,000 patients who suffered from the disease in easily accessible parts of the body. For these patients treatment by surgery, often combined with radiation, or radiation alone, was effective, especially in the early stages of the disease. Even when the disease appeared too far advanced for any treatment designed to be curative a considerable amount of alleviation and occasional cures could be obtained by the expert use of radiation. Moreover, it was not uncommon for "cures," by the usually accepted standard of five years' freedom from symptoms, to result from irradiation of what appeared to be a hopeless case.

"BOGY" OF INCURABILITY

It appeared from such investigations and estimates as the Ministry had been able to make that, under present conditions, only about one-quarter of the patients who could be treated with advantage obtained treatment at centres which were adequately equipped and staffed. He meant by that having expert surgeons, expert radiotherapists, and a sufficiency of radium and deep *x*-ray apparatus. It was true that not all the remaining patients were susceptible to treatment, but more might become so if facilities were improved. Some of these cases, for example, belonged to the large group of cases of intestinal cancers, in which symptoms were commonly so indefinite that they were neglected until the disease was far advanced. For such cases the problem was not so much the provision of treatment as promotion of that earlier diagnosis which was so vital.

The long waiting lists at most of the voluntary hospitals had two consequences of great importance to the cancer patient. First, there might be delay in initiating treatment, and, secondly, few voluntary hospitals were able to afford bed accommodation for those patients who were beyond hope of cure and whose sufferings could be greatly alleviated by modern treatment.

There was another cause of delay. Many cancer patients applied for treatment only at a stage when treatment was no longer possible. The reason for this appeared too often to be that the patients, realizing they were not well, and fearing that they were suffering from cancer, which they regarded as incurable, delayed seeking advice until the disease was too advanced. For many diseases delay in seeking medical advice was dangerous; for cancer it was deadly. This bogy of incurability was one of the things that the Bill was designed to combat.

LOCAL ORGANIZATION AFTER CONSULTATION

They proposed by means of this Bill to attempt to secure that no one, wherever domiciled, who was suffering or suspected by his doctor to be suffering from cancer, would be out of easy reach of the best available advice. Further, everyone would be able to obtain admission to an appropriate hospital, whether for further examination or for whatever treatment was best suited to his condition. The Bill provided for the organization by county and county borough councils throughout the country of arrangements for the diagnosis and treatment of cancer. In the London area conditions were not similar to the rest of the country, and the problem to be dealt with was less than elsewhere. The large voluntary hospitals here were in a position to ensure that few patients with cancer could not obtain readily full facilities for adequate treatment, provided the patients attended at an early enough stage of the disease to make it practicable, while the hospitals administered by the London County Council provided themselves extensive facilities for treatment. It had been estimated that out of some 11,000 persons in London suffering from cancer, about 10,000 were now receiving some form of treatment. Similar conditions applied to almost the same degree in some of the larger towns, and a principal object of this Bill was to secure further progress in the parts of the country not so fortunately situated.

The local authorities were required to submit to the Minister schemes showing their arrangements for ensuring that patients should receive whatever treatment was best fitted to their condition. These schemes would be worked out after consultation with the voluntary hospitals and medical practitioners in the area and with the Radium Commission. Additional beds would be needed in some districts, and centres for consultation so conveniently placed as to be available for the whole population. Provision was made for the combination of local authorities in joint committees, on which persons other than members of the local authorities could be co-opted. This should bring in the staffs and boards of voluntary hospitals, and should make it possible for two or more authorities to use one treatment centre. It would also be possible for one local authority to utilize the services, in appropriate instances, of two or more treatment centres.

FINANCE OF THE SCHEME: EXCHEQUER GRANT

This was not a radium Bill; it was a cancer Bill. It aimed at bringing the whole range of treatment, by every means of proved efficacy, within the sphere of every person in the United Kingdom. The proposals would involve the expenditure of money, and would be financed by local and central authorities in conjunction with each other. The additional liabilities imposed on local authorities by the Bill were to be assisted by grants from the Exchequer. This would be done at first by specific grants to each local authority, and later by an addition to the total of the block grant. The expenditure to be taken into account in determining the grant would be the additional expenses incurred by local authorities in excess of those already incurred by them in the year ended March 31, 1938, on the treatment of cancer, and was to be determined to the satisfaction of the Minister in accordance with directions to be given by him after consultation with the appropriate associations of local authorities and, if necessary, with individual local authorities.

It was estimated that the Exchequer contribution when the service was in full operation (which would probably be some five years hence) would amount to approximately £300,000 per annum for England and Wales and £50,000 for Scotland. At a very rough estimate the charge on the Exchequer during the first year of the operation of the scheme would not exceed £70,000.

TREATMENT AND DIAGNOSTIC CENTRES

This estimate was based on the assumption that in order reasonably to meet the more immediate future needs there would be required, first, the equivalent of about twelve new treatment centres in addition to the twenty-two existing treatment centres fully equipped and staffed, with radiotherapeutic departments, at general hospitals geographically distributed over the country. The twenty-two centres were situated at hospitals so placed geographically that there were still large areas of the country for which the proper facilities were not reasonably accessible. Thus, in England and Wales

we had one hospital on the Tyne, three in the West Riding, three in South Lancashire, four in the Midlands, two in the Eastern Counties, one on the Cornwall-Devon border, one in South Wales, one in Hampshire, one on the Severn, and one near London, leaving three principal areas of the country inadequately provided for. These were a horizontal band of country south of the Tyne, between it and the West Riding, North and Mid-Wales, and an oblique band from the Wash to Devon.

The largest of the National Radium Centres were associated with the teaching hospitals of provincial medical schools, and it was hoped that through these channels, as well as others, a larger number of expert radiotherapists would become available to staff the existing centres, when expanded, and the new ones to be formed. It could not be too strongly emphasized that treatment by radiation must be administered by those who had received special training. In inexpert hands both radium and *x* rays were dangerous. When radium was first introduced for the treatment of cancer there was not infrequently damage to patients, because the dangers resulting from the inexpert use of this powerful weapon were not fully realized. The same applied to the use of deep *x* rays.

Secondly, additional beds, approximately 1,000 in number, would be required at the existing or new centres or in hospitals associated therewith; and, thirdly, about 300 to 350 consultation centres for diagnostic and other purposes.

The estimate of an Exchequer contribution of £300,000 for England and Wales was based on the assumption that the total net additional expenditure of local authorities in England and Wales would be in the region of £600,000—namely, additional beds, £390,000; consultation centres, £350,000; and, say, £30,000 for travelling expenses of patients. This total would be reduced by the amount recovered from patients. This amount was necessarily conjectural, and had been assumed as £170,000, thus giving the net total cost of £600,000 for England and Wales, involving Exchequer grants of £300,000.

PROPOSALS CONCERNING RADIUM

Turning to the provision of radium and other radiotherapeutic substances, Dr. Elliot said that in this matter they proposed to work through the two existing organizations—the National Radium Trust and the Radium Commission. These bodies were constituted by Royal Charter in 1929, the Trust to acquire and hold radium and the Commission to manage its distribution. The Trust owned about 20 grammes of radium, which it bought out of funds provided partly by public subscription and partly out of a grant of £100,000 from the Exchequer. It had also about 18 grammes on loan with an option to purchase at £4,500 a gramme, including containers. This radium could not be retained indefinitely on loan; and if it was to be kept for use here the Trust must be put in a position to pay for it. The radium managed by the Commission was at present distributed mainly in the twenty-two radium centres already referred to. Clause 3 of the Bill provided that the Minister might, from moneys voted by Parliament, lend the Trust up to a maximum of £500,000 to enable it to buy radium and other radio-active substances and apparatus and appliances for radiotherapeutic treatment. Obviously the first charge on this fund would be the money to enable the Trust to pay for the 18 grammes which it had on loan. But more radium would be required for the purposes of the Bill, and when the Government decided on its introduction it authorized the Trust to negotiate for further supplies before its decision was made public. The Trust had accordingly secured an option to buy a further 10 grammes a year for the next five years at a price of £4,500 a gramme, this not including containers. The Trust was, however, not pledged to buy more than 2 grammes a year (10 grammes in all), so that the new actual commitment amounted to not more than about £50,000, and the Trust had an option which, if it exercised it, would involve an expenditure of another £200,000. If the price of radium fell, the Trust would be able to take advantage of the lower price except in regard to the 10 grammes mentioned, and it could, of course, accept tenders from other companies if the price was satisfactory.

The radiotherapeutic treatment of cancer included the use of deep *x* rays as well as radium. Experiment in the technique of this form of treatment was constantly proceeding—for example, recent experiments with a voltage of 1 million. Also, the recent invention of the cyclotron had opened up possibilities of new developments. It was desirable that the financial resources and the services of the Trust should be available in respect of these other forms of radiotherapeutic treatment. To enable it to carry out these new functions effectively consideration was being given to the revision of its Royal Charter: (1) so as to authorize it to acquire and hold other substances and appliances for radiotherapy, in addition to radium; and (2) to provide for any desirable alterations in the personnel of the Trust and Commission.

PROHIBITION OF MISLEADING ADVERTISEMENTS

Clause 4 of the Bill prohibited the publication of misleading advertisements offering treatment and cures for cancer. These advertisements were not accepted now by the two great newspaper organizations (the Newspaper Proprietors' Association and the Newspaper Society), both of which had informed him that they supported the inclusion of this clause. Many of the so-called cures for cancer which had from time to time been offered to the public were in themselves harmful: their danger was that of inducing the sufferer to postpone proper treatment until it was too late. The Bill accordingly prohibited the circulation of these advertisements to the lay public, while placing no difficulties in the way of bona fide announcements made to the medical, nursing, and pharmaceutical professions, whether in respect of the methods of treatment already referred to as being effective or of other methods which might be discovered in the future.

There would, he thought, be no objection to the main purpose of the Bill. It had, however, been suggested that the weighting of the population which was adopted for block grant purposes was unsuitable for the present service. On that it might be said that the weighting was designed to give effect to the relative needs of various authorities in relation to their expenditure as a whole, and that any question of the suitability of the weighting factor was not appropriate to the present Bill. This basis of distribution was reviewed less than two years ago, accepted by the associations of local authorities, and again confirmed by Parliament.

On the technical side it had been suggested that the Bill provided for too great an expenditure upon radium. It would be realized that there was a difference between the world-wide attack on causes that science everywhere was making and this national attack on the disease itself by means of diagnosis and treatment. Great Britain played a prominent part in research, carried on either under the aegis of such organized bodies as the Imperial Cancer Research Fund directed by the Royal Colleges of Physicians and Surgeons, the British Empire Cancer Campaign controlled by a group of distinguished lay and medical persons, or by specialized institutes and organizations such as those of the Royal Cancer, Middlesex, St. Bartholomew's, London, Leeds, Edinburgh, and other hospitals or by individual workers. He had already received an assurance from the Imperial Cancer Research Fund and the British Empire Cancer Campaign that they would continue to do their utmost, and he was sure this would apply equally to the other voluntary organizations he had mentioned. He need not remind the House also of the most valuable research which had been carried on for many years by the Medical Research Council, with the help of moneys provided by Parliament. This indispensable work would, of course, be continued and developed quite independently of the present Bill.

DEEP X-RAY THERAPY AND THE CYCLOTRON

Mr. J. D. COOKE said that up to the present the cause of cancer had not been discovered. It was, nevertheless, quite certain that by a combination of methods many patients were being cured to-day. Emphasizing that early diagnosis was the most important thing, he said that there was no surgeon

who did not recognize that radium, *x* rays, and surgery were much less important than the fact of getting the cases known. A greater number of patients could be cured if they could arrive at an earlier diagnosis and give earlier treatment. There was no question about the importance of the educational factor, but there were many difficulties to overcome. It was very necessary that, in giving information about the disease and the necessity for early treatment, they should avoid creating a form of cancer neurosis. All medical men knew that although cancer was a very serious disease, the fear of cancer was almost as bad, and it would not be easy to conduct an effective educational campaign unless they recognized and dealt with this difficulty. These difficulties could be got over by stressing the great improvements in scientific treatment and the fact that a very large number of patients could be cured—and without operation, which was a thing that people objected to—if only they would take steps to have the condition diagnosed and treated. Publicity in the Press would be a great help; and in several ways possibly the B.B.C., by means of scientific health talks in which this particular matter could be gently and delicately introduced, could render assistance.

The next important thing was that there should be readily available for the patient for early treatment the resources of the hospitals—the surgeon, the radiologist, the expert in radium, and the nursing staffs. It was quite wrong to suggest that there need be any fear of this team of experts. He did not think it would be possible under the Bill to give all the increased educational facilities needed for training people. It was vital that every opportunity should be taken to give the fullest scope for further education in this direction, because *x* rays and radium were most dangerous weapons. It was most important that this Bill should not be regarded as a radium Bill. In recent months, perhaps years, the value of deep *x*-ray therapy, compared with radium therapy, had been increasingly appreciated. The former had certain advantages: it was much less expensive, it could be applied with a greater degree of safety, it had a deeper penetration, and it could be made more regionally available all over the country. More especially in superficial cases it was more effective than radium.

The Bill would certainly increase the opportunity for therapeutic research. Every bed made available for the treatment of cancer was a source of therapeutic research. There was great scope for work at the present time in deciding whether deep *x*-ray therapy was superior to radium treatment. There was also an instrument in use called the cyclotron, which was invented in the United States. He did not understand it himself, but it produced what were called neutrons, which were said to have a penetrating power five times as great as radium and deep *x* rays. There were, he understood, only two of these instruments in the country to-day—one at Liverpool and one at Cambridge. He mentioned these things to emphasize the fact that scientific progress was constant and progressive, and although at the moment there might be a suggestion that £500,000 should be spent on radium, they must contemplate the possibility that within a year or two something much more important and effective would be available. It was most important that the research and the funds should be made available not only for radium but for any other treatment that might be equally or possibly more effective.

A most important thing in regard to hospital work was the follow-up observation treatment. The Minister had made an important provision by arranging that the travelling expenses of the patients and the friends who accompanied them might be paid. Otherwise, there might be a tendency on the part of persons who could not afford the expense to neglect the second, third, fourth, and even fifth visits which ought to be made to the hospital. On the whole the Bill would prove magnificent in its effects.

PLANS FOR SCOTLAND

Mr. WEDDERBURN said that the need to make modern facilities for diagnosis and treatment of cancer available was no less in Scotland than in England. Deaths from cancer in Scotland numbered 7,810 in 1937, as against 3,635 deaths from all forms of tuberculosis. It was estimated that the number of diagnosed cases of cancer in Scotland to-day exceeded 12,000. There were four Scottish centres approved by the Radium Commission—at Glasgow (2), Edinburgh, and Aberdeen. Extension of the cancer service in Scotland might be based on the existing national radium centres, with the addition of perhaps one other. From these centres a service would be regionally organized to cover the whole of the country. Within each region there would be subsidiary hospital centres (generally in large towns) where consultative sessions would be conducted by experts from the parent centre, who would also supervise such treatment as could be carried out at some of the local centres and refer to the parent centre cases that required highly specialized resources. These local consultation centres would be useful also for follow-up work. It was estimated that the additional provision necessary for the early treatment of cancer in Scotland should provide for about 6,000 patients a year. Assuming that each cancer bed if fully utilized would deal with about twenty cases a year, a total of not less than 300 beds would probably suffice. This would involve the provision of perhaps from 150 to 200 new beds. It was proposed to set up a small advisory committee in Scotland composed of persons having the necessary experience of local government and of treatment requirements to review existing facilities for cancer treatment and the possibility of expansion of these, and to make recommendations on the extent to which it appeared desirable that local authorities should act together in making arrangements for the cancer service.

MEDICAL OPINION: "A RADIUM BILL"

Dr. SUMMERSKILL thought the Bill would make some small contribution to combating cancer, but it should be called a Radium Bill; it was not in the slightest respect a comprehensive Cancer Bill. The Minister was over-optimistic in saying that the cancer centres would be adequately staffed in five years; she would put it at, perhaps, fifteen years. The Bill said nothing about finance for research. The lower they got in the economic scale the more sharply the cancer death rate rose, and the poor were not being treated in the first stages. The only long-term solution of the problem was to introduce a State medical service in the country.

Sir ERNEST GRAHAM-LITTLE said that the Minister of Health should have consulted the experts who had knowledge and experience behind them. The Minister was mistaken, no doubt genuinely, in thinking that the Bill would not be regarded as a Radium Bill. He (Sir E. Graham-Little) had found consternation in the ranks of those who practised these special subjects. They said that the net result of the Bill was to impress on the public that there was nothing but radium for the treatment of cancer. Unfortunately the Minister had not overtaken the actual therapeutic position of the treatment of cancer. Radium was really a receding force rather than an advancing one. It was not nearly as safe as some other treatment, and required the most expert and special knowledge.

Emphasizing the extreme difficulty of early diagnosis of cancer, he pointed out that it was the general practitioner who saw the early cases. Unfortunately, the general practitioner was not in love with the Bill. It became even more necessary here than in any other department of medicine that the general practitioner should be more able to recognize the disease. He was voicing a considerable section of specialist opinion when he said that the scheme for the arrangement of the centres entirely through the local authorities was very suspect. In London the voluntary hospitals would be distinctly uncomfortable at the idea that they had to apply to the London County Council for any help under this scheme.

Pleading for more research, he said that one view was that the cause of cancer was an ultra-microscopic virus. Surely the obvious remedy for that was to experiment with better microscopes. With microscopes of greater power the prospect was very strong of being able to find the actual causes of many diseases which at present were rather glibly described as ultra-microscopic. It was in that direction that money should be freely spent. Provision for this, which was much

the most important part of the cancer problem, had been scandalously under-estimated in the scheme.

Sir HENRY MORRIS-JONES urged that general practitioners should be in a position to send any case of which they were in doubt to a hospital, not only for treatment but for investigation. Unless facilities for investigation were coupled with those for treatment there was a danger that the Bill would be weak in this aspect of dealing with the problem. The Minister had made ample provision in the Bill to enable him to consult all those involved, both lay and professional, in such a way that the best advice was secured for the interests of those suffering from cancer. He welcomed the Bill, which was in the right direction.

THE GENERAL PRACTITIONER AND THE SCHEME

Sir FRANCIS FREMANTLE said the Minister, to a certain extent, had himself to blame for the fact that there had been such an outcry that the Bill had been produced as if it were a Radium Bill. Although it was called a Cancer Bill, it was recognized everywhere that the reason for the secrecy was the proposed purchase of, or the option to purchase, radium. Therefore that seemed to be the centre of the proposal in the Bill. The lines on which the Minister now recommended the Bill to the House were laid down in a memorandum on the provision of radiotherapeutic departments in general hospitals, issued by the Ministry of Health in March. One paragraph of that memorandum stated that "the effective treatment of cancer now demands the partnership of three highly specialized forms of therapy—surgery, radium, and *x* rays." In a report of the Medical Research Council, of which he (Sir Francis Fremantle) had an advance copy, there were summarized the reports from all the research centres, and there was a table showing the relative frequency of surgical and radiological treatment in the research centres. By surgical treatment alone 27 per cent. of the cases had been treated; by radiation alone, 31 per cent.; and by *x* rays alone, 23 per cent. That showed that in the research centres and hospitals the figures were fairly easy as between the three different methods of treatment. That was a reason why the Bill should not be called a Radium Bill, but a Bill for the treatment of cancer in the best up-to-date way.

The general practitioners were the persons to whom people went when they had something wrong with them. Was the Ministry of Health consulting the organizations which represented the general practitioners? It might be that the Ministry was doing that, but he asked for an assurance that the British Medical Association would be consulted, if they had not already been consulted, concerning the terms in which the scheme was to be worked out. The general practitioners ought to be brought into the scheme from the beginning, because it was on them that we must depend. More and more research was needed. One of the greatest things the Minister could do would be to see that provision was made for the proper training of medical men in the latest methods of radium and *x*-ray treatment. It would be possible and wise to set aside some particular place and to build up a school for training these people.

GOVERNMENT REPLY

Mr. BERNAYS, replying to the debate, said it was certainly not the Ministry's intention to press radium on the medical profession. There was no intention in any way to stereotype the method of the treatment of cancer. That was a question for the specialist. If the Minister had announced the introduction of the Bill before he was ready it would have sent up the price of radium. Therefore it was not possible to have prior consultations. What mattered most was the consultations about arrangements which would be made under the Bill, and he gave the fullest assurance that the Minister would keep in the closest touch with the medical profession and those skilled in the newest methods of remedy. The Minister would be willing to consider a conference with expert members of the medical profession if a desire for it were expressed by all the interests concerned.

The Bill was read a second time, and committed to a Committee of the whole House.

Obituary

The death of Emeritus Professor H. C. J. GRAM on November 14 recalls that method of staining with which his name has been identified among many generations of bacteriologists. He was born in 1853, the son of a professor of law. It was as early as 1884 that he described his method of staining, and it was a source of considerable amusement to him that thenceforth he should be best known to the medical world outside Denmark by this reaction. His first scientific publications dealt with the number and size of the blood corpuscles. He was, however, interested in clinical problems, and one of his studies in this field concerned the clinical reactions of theobromine. In 1891 he was appointed professor of pharmacology, and in the following year he assumed the duties of senior physician to the Frederik Hospital, Copenhagen. In 1900 he was appointed a professor of medicine, and he did not retire from his hospital and professorial appointments till 1923.

An obituary notice of Dr. N. D. BARDSWELL appeared in our last issue at page 1234. The following cable from the Governor of Cyprus has been received by the National Association for the Prevention of Tuberculosis: "I have learnt of Dr. Bardswell's death with deep regret, which will be shared by all classes in Cyprus, where his work and visits have entirely changed public attitude towards tuberculosis in a manner which is of greatest assistance to Government in its campaign against the disease. I should be grateful if sincere condolences could be conveyed to Mrs. Bardswell."

Correction.—In the memoir of Professor W. McDougall published last week the word "uncriticizability" was by inadvertence printed "uncriticized ability."

Universities and Colleges

UNIVERSITY OF BRISTOL

C. H. G. Price has been approved at the examination for the degree of M.D.

UNIVERSITY OF SHEFFIELD

At its meeting on December 9 the University Council received the resignations of Dr. Arthur Pool of the post of lecturer in mental diseases and of Mr. A. W. Fawcett of the post of lecturer in surgical pathology. The Council accepted the resignations with regret and thanked Dr. Pool and Mr. Fawcett for their services to the University.

UNIVERSITY OF WALES

WELSH NATIONAL SCHOOL OF MEDICINE

The following candidates for the degrees of M.B., B.Ch. have satisfied the examiners at the examination indicated:

SURGERY.—G. C. D. Evans, R. Tipple.

NATIONAL UNIVERSITY OF IRELAND

The honorary degree of LL.D. was conferred on Sir Walter Langdon-Brown, Emeritus Professor of Physic in the University of Cambridge, at University College, Dublin, on December 8.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

An ordinary meeting of the Council was held on December 8, with the President, Mr. Hugh Lett, in the chair.

Mr. Seymour Barling was appointed to represent the College on the Court of Governors of Birmingham University, and Mr. L. E. C. Norbury on the Central Council for District Nursing.

It was decided that the following words should be added in parentheses between paragraphs 15 (*b*) and 15 (*c*) of the regulations for the Fellowship:

> "Provided that the candidate has dissected the entire cadaver, the study of dissected parts either in the dissecting room or in the museum may be included in the sixty weeks."

Diplomas

Diplomas of Fellowship were granted to the following thirty-nine candidates:

G. MacI. Housden, M. Gordon, H. J. Croot, D. M. Cooper, I. N. Blusger, R. Sampson Handley, I. H. Griffiths, Margaret M. C. Louden, B. W. Fickling, E. P. H. Drake, S. R. Chandra, H. R. S. Harley, S. Marinker, V. D. Logue, H. S. Kander, E. H. Hambly, J. K. Bremer, E. S. James, E. A. E. Hedberg, L. Chanock, N. R. Desai, A. W. Douglas, E. E. Dunlop, H. H. Eddey, N. Garber, W. B. Highet, T. G. Lowden, R. I. Mahadevan, Mary H. Mayeur, K. Mazhar, F. H. Mills, A. L. Newson, H. R. C. Norman, J. G. O'Donoghue, R. Orgias, H. Park, E. P. Row, H. Sobhi, G. M. Thomson.

Diplomas in Anaesthetics were granted, jointly with the Royal College of Physicians of London, to the following seventeen candidates:

J. N. Abelsohn, P. T. Ashby, C. J. Bashall, A. K. Boyle, J. T. H. Butt, W. A. Cobb, T. Dinsdale, Margaret B. Dow, P. G. L. Essex-Lopresti, N. R. James, D. C. R. R. Jenkins, A. Leitch, A. D. Morgan, O. N. Roussel, R. Shaw, A. J. Smith, Una M. Westell.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

At a meeting of the Royal Faculty of Physicians and Surgeons of Glasgow, held on December 5, with Dr. John Henderson, president, in the chair, the following were admitted Fellows of Faculty under Chapter III of the regulations:

Duncan McCallum Blair, M.B., Ch.B., D.Sc., John William McNee, M.D., F.R.C.P.

The following were admitted Fellows of Faculty under Chapter II of the regulations:

Prem Datta Bhargava, M.B., B.S., D.T.M. and H., Hugh Cameron McLaren, M.B., Ch.B., Nau Nihal Singh, M.B., B.S., D.T.M., Thomas Ferguson Stewart, M.B., Ch.B., John Wilson, M.B., Ch.B.

Medical News

The House of the British Medical Association, including the Library, will be closed for the Christmas holiday from 5 p.m. on Friday, December 23, to 9 a.m. on Wednesday, December 28 (Library 10 a.m.). Owing to the holiday the *Journal* for December 24 will go to press on Tuesday, December 20, and all editorial communications and advertisements intended for that issue should reach the Editor and Advertisement Manager respectively by the first post on Monday, December 19, at the latest. Material for the issue of December 31 should reach the Editor or Advertisement Manager by the first post on Friday, December 23.

A meeting of the Royal Microscopical Society will be held at B.M.A. House, Tavistock Square, W.C., on December 21, at 5.30 p.m., when papers will be read by Mr. J. Smiles on "The Application of Annular Oblique Incident Illumination to the Study of Normal and Infected Chorio-allantoic Membrane" and Mr. N. Ingram Hendey on "Some New Species of Diatoms."

The issue of *La Riforma Medica* for October 8 contains an illustrated account of the eleventh International Congress of Surgery, held at Brussels from September 19 to 22, by Professor D. Giordano of Venice.

Dr. Joseph Hoguet has been appointed medical director of the New York World's Fair of 1939. The medical exhibits are to illustrate the progress of medicine and of public health and the anatomy of man.

The King has appointed Dr. Edgar Cochrane to be a Member of the Executive Council of the Island of Grenada.

On November 19, his seventieth birthday, Dr. Thomas S. Cullen, professor of gynaecology at Johns Hopkins University, was given a dinner at Baltimore.

The German Chancellor has recently awarded the German Red Cross distinction of the first class to the French physicians, Professor Baumgartner and Dr. Paul, for their treatment of Herr vom Rath, the assassinated Counsellor of the German Embassy in Paris.

EPIDEMIOLOGICAL NOTES

Acute Poliomyelitis

There was a slight decrease in the incidence of acute poliomyelitis in England and Wales during the week—37 (39 in the week before)—but in London the figures rose from 7 to 9 in the week under review. The chief counties affected were: London 9 (Wandsworth 3, Battersea, Deptford, Hackney, Lewisham, Stepney, Woolwich 1 each); Gloucestershire 4 (Bristol 4); Southampton 4 (Bournemouth 2, Southampton and Romsey 1 each); Essex 3 (Colchester, Hornchurch, and Ilford 1 each); Leicestershire 3 (Leicester 3). Of the 2 cases of acute poliomyelitis notified in Scotland 1 each occurred in Ayr County and Kirkcaldy.

Enteric Fever

Notifications of enteric fever in England and Wales rose in the week under review from 21 to 29, while in London they fell from 9 to 8. The chief centres affected were: London 8 (Islington and Shoreditch 2 each, Lambeth, St. Pancras, Stepney, Westminster 1 each); Durham 4 (Sunderland 3, Ryton 1); Essex 4 (West Ham 2, Hornchurch and Thurrock 1 each); Kent 3 (Dartford, Folkestone, and Penge 1 each). Another case of typhoid fever was notified at Shoreditch on Saturday, December 10, making a total at the time of going to press of 26 confirmed cases in the borough and 5 outside the borough, which are probably related to the outbreak. A second death from typhoid fever was reported in Shoreditch on Friday, December 9.

The Registrar-General's Statistical Review for 1937

In the middle of 1937 the estimated population of England and Wales was 41,031,000—19,705,000 males and 21,326,000 females. A birth-rate of 14.9 per thousand persons living was recorded; this rate was 0.1 above that for 1936, 0.2 above that for 1935, and 0.5 above that for 1933, which was the lowest ever recorded. The highest rates were recorded in Staffordshire (17.4) and Durham (17.1), and the lowest rates in Cardiganshire (11.4) and East Sussex (12.0). The death-rate for the year was 12.4 per thousand persons living: 0.3 above that for 1936 and 0.7 above the rate for 1935; it is the highest rate recorded since 1922 with the exception of that for 1929, when the rate was 13.4. When allowance is made for the fact that the average age is increasing every year the resulting corrected death-rate was 9.3, or 0.1 above that for 1936 and 0.3 above that for 1935, the lowest on record. Over a hundred years the average death-rate was 5.1 at ages 5 to 10 years, 3.0 at ages 10 to 15, and 274.1 for people of 86 years and over.

Deaths from all causes in 1937 were 260,057 males and 249,517 females. Infectious and parasitic diseases accounted for a total of 57,996 deaths, compared with 47,769 in 1936, the lowest on record. At 1.41 per thousand the specific mortality from infectious diseases represented an increase of 0.24 per thousand on that of the previous year. The increase was due mainly to the influenza epidemic in the first quarter of the year, when 8,991 males and 9,644 females died from that disease, compared with 3,176 and 2,881 respectively in the previous year. The measles death-rate per million children under 15 years of age, which up to twenty years ago was seldom below 1,000, reached the low record of 114. The scarlet fever death-rate (31 per million under 15) was the lowest recorded, and the whooping-cough death-rate of 195 was the lowest except in 1935, when the rate was 170. There were 152 deaths from infantile paralysis, compared with 102 in the previous year, while the number of deaths from food poisoning (22 males and 15 females) is the highest in the eleven years in which records are given. A decrease was recorded in the mortality of women due to the accidents of child-birth; a rate of 0.94 from septic causes and 2.19 from other causes per thousand live and stillbirths was recorded, compared with rates of 1.34 and 2.31 respectively in 1936. The mortality of infants under 1 year was 58 per thousand live births and was 1 per thousand greater than that for 1935, the lowest on record.

No. 48

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended December 3, 1938.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (*a*) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns (125 in 1937) in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1938					1937 (Corresponding Week)					1929-37 (Median Value Corresponding Weeks)	
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)
Cerebrospinal fever	16	1	7	—	—	17	1	9	2	—		
Deaths		—	—				1	1				
Diphtheria	1,545	156	248	72	19	1,765	210	268	63	43	1,465	210
Deaths	28	4	8	2	1	44	6	6	7	1		
Dysentery	64	15	21		1	454	124	42		—		
Deaths				—	—				—	—		
Encephalitis lethargica, acute	6	—	—	—	—	2	—	—	—	—		
Deaths		—					—					
Enteric (typhoid and paratyphoid) fever	29	8	2	7	4	72	5	—	8	1	36	
Deaths	—	—	—	—	—	4	—	1	—	—		
Erysipelas			81	3	7			78	5	7		
Deaths		—					1					
Infective enteritis or diarrhoea under 2 years												
Deaths	41	13	11	5	3	38	8	12	4	5		
Measles		24	34		7			353		159		
Deaths	1	—	—	1	—	18	2	7	3	4		
Ophthalmia neonatorum	72	8	21		—	74	9	24		—		
Deaths												
Pneumonia, influenzal‡	681	97	18	6	13	1,096	123	39	4	8	1,075	123
Deaths (from influenza)	24	1	3	6	2	45	7	14	—	1		
Pneumonia, primary			373	11				548	10			
Deaths		1		14	11		27		23	17		
Polio-encephalitis, acute	—	—				3	1					
Deaths		—					—					
Poliomyelitis, acute	37	9	2	2	—	21	1	—	—	—		
Deaths		—					—					
Puerperal fever	11*	11	10	3	1	9*	9	12	—	—		
Deaths		2†					2†					
Puerperal pyrexia	130	15	11		1	180	20	19		—		
Deaths												
Relapsing fever	—	—			—	—	—	—		—		
Deaths												
Scarlet fever	1,909	158	359	64	91	2,689	171	592	130	111	2,700	326
Deaths	2	—	—	1	—	8	2	—	1	—		
Small-pox	—	—	—		—	—	—	—		—		
Deaths		—		—	—		—		—	—		
Typhus fever	—	—	—	—	—	—	—	—	—	—		
Deaths				—	—				—	—		
Whooping-cough		190	325		10			47		6		
Deaths	16	4	7	1	—	8	2	2	1	—		
Deaths (0-1 year)	348	66	74	39	20	377	78	110	36	20		
Infant mortality rate (per 1,000 live births)	58	54				64	65					
Deaths (excluding stillbirths)	4,574	878	691	192	147	5,461	1,171	787	186	170		
Annual death rate (per 1,000 persons living)	11.2	11.2	14.1	13.0	13.0	13.5	14.7	16.1	12.7	15.1		
Live births	6,073	1,146	880	290	202	5,806	1,111	786	336	212		
Annual rate per 1,000 persons living	14.9	14.6	17.9	19.6	17.9	14.3	14.0	16.1	22.9	18.8		
Stillbirths	245	32				298	53					
Rate per 1,000 total births (including stillborn)	39	27				49	46					

* After October 1, 1937, puerperal fever was made notifiable only in the administrative county of London.

† Deaths from puerperal sepsis.

‡ Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to The EDITOR, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Secretary, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS.—All communications should be addressed to the Advertisement Manager (office hours 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and communications with reference to subscriptions should be addressed to the Secretary, B.M.A. House.

The Telephone Number of the British Medical Association and the *British Medical Journal* is EUSTON 2111.

The Telegraphic Addresses are

EDITOR OF THE *BRITISH MEDICAL JOURNAL*, *Aitiology Westcent, London.*

SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh;* telephone 24361 Edinburgh), and of the Office of the Cumann Doctúirí na h-Eireann (I.M.A. and B.M.A.), 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin;* telephone 62550 Dublin.)

QUERIES AND ANSWERS

Medical Apparatus in 1816

Dr. I. E. McCracken (Newcastle-on-Tyne) writes: I cannot help Dr. Collins (*Journal*, November 12, p. 1028) in regard to part (1) of his query, but I can give him a reference to the term "suspended animation" in part (2). In the annual reports for the period he refers to of the Newcastle-on-Tyne Dispensary the term "suspended animation" is used often, and refers to attempts made to recover persons who apparently were dead from drowning. The committee of the dispensary instigated the development of centres on the banks of the river, where boatmen and others received instruction in methods of artificial respiration. I do not recall the mention of any particular apparatus being used for this purpose.

Condensation Water from Theatre Skylight

Dr. Leonard P. Lockhart (Beeston, Notts), in reply to Dr. E. S. Hemsted (December 3, p. 1188), writes: The following is a method successfully employed by me for over ten years. Run a copper gutter at the drip point with a tubular drain through the woodwork, and don't let painters ever block up the outflow. This guttering and drain need periodic cleaning.

LETTERS, NOTES, ETC.

The Problem of the Female Inebriate

Dr. Courtenay C. Weeks (33, Bedford Place, W.C.1) writes: From time to time medical practitioners are faced with the problem of what to do with female inebriates whose financial position prevents them from being sent to the more expensive nursing homes. May I bring to their notice the excellent shelter home run by the C.E.T.S. and the Women's Union at Highbury, London, N.5. I can vouch for the home and for the care with which the inmates are treated. Full particulars may be obtained from Miss F. E. Relf, Women's Union, 27, Gordon Square, London, W.C.1.

Contraindication to Sulphanilamide Therapy

Dr. E. Ivimy Puddy (King's Lynn) writes: In view of the statement that "no ill effect has been known to occur to babies whose mothers are receiving this [sulphanilamide] therapeutic remedy," made by Dr. V. E. Lloyd in the October number of the *Journal of Clinical Research*, may I report the following exception. A primipara, aged 23, was delivered by forceps on April 29; the perineum was sutured. Puerperal pyrexia followed. On May 5 I prescribed one 7½-grain tablet of prontosil album three times a day. The infant, which was breast-fed, had had icterus neonatorum but was steadily improving, and the skin was only a pale lemon colour. On May 7 the infant had become an orange colour and the prontosil was stopped forthwith in view of this sudden worsening of the jaundice. By May 14 the infant had recovered. Since this occurrence I have regarded icterus neonatorum in a breast-fed infant as a contraindication to the administration of prontosil to the mother.

Infections of the Hands and Fingers

Mr. J. L. Aymard writes: The tribute you paid to the late distinguished surgeon Sir David Wilkie by publishing his valuable article upon the above subject in your issue of December 3 leads me to say that, though we differed on some minor points, upon the main issue of lymphatic control we were thoroughly agreed. Only one point, which must be of great interest to those who have read and studied the reference to upper arm control by an elastic band and the figure reproduced on page 1127, I will supplement by quoting from a letter he wrote to me on July 23. "It may very well prove that elastoplast is equally good or better than an elastic bandage to produce mild venous and lymph stasis in a limb. However carried out there can be no question of its value in acute infections." My attempt to expose Bier's congestion as a myth handed down will be found in a book, *The Foment Danger, Wound Infection and its Treatment by Lymphatic Control and Elastoplast*, just published by Messrs. Cornish Bros., New Street, Birmingham.

Thimble for the Surgeon

Dr. F. Allen (Nagpur, India) writes: In the *Journal* of October 15 (p. 789) there appears a note by Dr. T. E. Coulson on the use of a thimble. I should like to point out that I was taught this method years ago by Sir William de Courcy Wheeler, and I believe it is mentioned in his book on operative surgery.

Infra-red Rays

"G.P." writes: Perhaps more attention should be paid to the treatment of neuritis and neuralgic pains by infra-red rays. I have had neuritis of the arm for two years or more, and sometimes the pain has been very acute and has lasted for hours. Treatment by drugs, such as salicylates, quinine, arsenic, and iron, proved quite valueless. I set up an infra-red lamp and started treatment five days ago. The pain has entirely gone, though it is too early to say it will not recur. I might point out that it is not necessary to undress to apply the rays; the removal of thick clothing, such as the coat, is all that is required.

Medical Postage Stamps

The eagerly awaited Curie stamp has reached us from France, horizontal in shape, blue-grey in colour, 1 franc 75 centimes plus 50 centimes in value, and bearing the legends "Pierre et Marie Curie découvrent le radium Nov. 1898" and "Union Internationale contre le Cancer." Though the expressions are pleasing enough, the design is overcrowded and unbalanced. A similar stamp has also been released by each of the twenty-one French colonies, lighter in colour and with a slightly different inscription. Soviet Russia has recently issued a set of seven child welfare stamps, all of which are horizontals except the 15 copecks (upright). On the 10 deep green a young mother watches her baby being weighed at a maternity station. The 15 blue-green depicts children receiving a history lesson around Lenin's statue in Leningrad. On the 20 violet-brown and the 40 light brown children are seen looking through microscopes. The 30 red-brown figures boys at a Crimean pioneer youth camp, and on the 50 deep blue and the 80 light green children are portrayed playing with mechanical toys built by themselves. While the designs are interesting and even striking, artistically they cannot compare with some of the previous issues.

Corrigendum

In a summary of a paper which Dr. Francis Braid read at the annual meeting of the British Orthopaedic Association (*Journal*, December 10, p. 1222) "secondary to cirrhosis of the liver (present in both patients)" should have read thus: "dysfunction of the liver, evidence of which was present in one of the patients."